



## Building Timbers of the Empire

By H. D. SEARLES-WOOD, VICE-PRESIDENT R.I.B.A.

THE Timbers Committee of the Imperial Institute has been engaged for five years in investigating the resources of the Empire, during which time it has considered a large number of different woods, specimens of which can be seen at the Imperial Institute. I give in an appendix a list of them. Out of this list the Committee has selected about 40 woods which it regards as suitable for the building and furniture trades in this country.

The Committee is careful to ascertain whether the timber can be obtained in quantities sufficient to make a commercial success if introduced into this country, and in several instances careful mechanical tests and practical trials have been made before the selection has been settled.

In conjunction with the Empire Forestry Association the Committee propose to bring together samples of Empire timbers in a special collection at the Imperial Institute in order that users of timber may ascertain the varying characteristics of the woods, from different parts of the Empire, and obtain full particulars of each timber to assist them in making their selection. It is hoped that this systematic exhibition will be used by the trade and the public, the success of the Timber Exhibition of 1920 having shown the need of such a collection. It is also under consideration to form a representative collection of those important timbers which the Committee has selected, and to send them round to important centres in the country; and our Allied Societies could give valuable help in this scheme. The Conjoint Board of Scientific Societies prepared

for the Royal Aeronautical Society a short list of standard names. I have given this as an appendix, as standard names for timbers would save endless confusion, and a complete list should be made which could be accepted by timber users and the timber trade.

The home-grown timbers of the United Kingdom are alder, ash, beech, birch, box, chestnut, elm, silver fir, holly, hornbeam, larch, lime, oak, plane, pine, poplar, spruce, sycamore, walnut, willow and yew.

With regard to the soft woods, the timbers commonly used and required by architects which they understand can be grown in the United Kingdom are red wood, white wood, and American yellow pine. Scots pine was the only wood used in many of the ancient Scottish castles, where it has withstood the wear and tear of centuries and remains sound until the present day.

Of the hard woods, at one period British timber held a world-wide reputation. British ships constructed of British oak were pre-eminent. The same timber was held in high esteem for building purposes, and was extensively employed for cabinet and other work.

In home-grown oak there are two main varieties—white and brown, both of which abounded in our forests in the past. Turkey oak, introduced into this country about 170 years ago, is in many respects similar to American red oak, and is of practically no value. It runs heavily to sap, and is often shaky. In appearance it is more of an ornamental tree, and the acorn cup is spiky—not smooth, like the white oak cup.

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I have been fortunate in getting from Mr. Fraser a most excellent sample of Turkey oak, which you will find among the samples shown. You will see that this sample carries heavy sap, but the amount is by no means exceptional, for many Turkey oaks are practically all sap. In addition you will notice the heart shakes.

Home-grown white oak varies enormously in texture and value, according to the district in which it is grown. For instance, oak from a county like Cornwall is small and coarse, and suitable only for wheelwrights' work. Oak from Sussex is splendid, but inclined to be hard. Oak from Northamptonshire, parts of Essex, Suffolk, Oxford, Lincoln, and so forth is of good size and mild in texture. Home-grown white oak is in demand for many classes of heavy work, but it also supplies some of the most beautiful panelling.

When wood grows old it becomes impregnated with waste products and gets darker in colour. If you compare the two samples of English quartered oak, you will see that the one which is cut from an old tree is much darker and richer in tone than the one which is cut from a young tree.

Some of these woods are still used for certain work, but for various reasons foreign timber had, before the war, largely displaced that of home growth, and several kinds of wood that had from time immemorial enjoyed a high reputation for strength and durability and beauty of finish were neglected by architects. Foreign woods, sometimes of distinctly inferior quality, placed upon the market in an attractive manner, came into fashion and the more solid British product was neglected. I have here a sample of American oak showing a peculiar form of shrinking, for which I can find no explanation. It shrinks on the heart edge. Although the importance of British oak is a tradition, architects have refused to specify British oak for panelling, flooring, and other purposes on the plea that it is unsuitable and inferior to wood of foreign growth, notwithstanding roofs, staircases, and panelling of undoubtedly British oak are the features of many old English churches and houses, where they have stood the test of centuries.

At the present time, in the two most important buildings now being erected, the panelling is Japanese and Austrian oak and Italian walnut.

The war created a reaction to a certain extent. Imported woods became scarce, and people who had relied entirely upon them were obliged to use

the home-grown products, and they were agreeably surprised to find that they possessed virtues with which they were unacquainted. But the best home-grown timber was comparatively scarce, and, owing to the heavy cutting during the war, the stock of growing timber in the British Isles was never lower than at present. Of many timbers there is bound to be a shortage for many years, but oak, elm, ash, poplar, willow, hornbeam, sweet chestnut, beech, birch, sycamore, alder, plane, pine, spruce, larch, and silver fir are trees that will provide a large quantity of timber for building purposes.

It is essential that the timber resources of the United Kingdom should be increased, but if timber must be grown it must be on business lines, and in time the National Forest Service and the privately owned forests must be self-supporting and capable of producing a dividend on invested capital. To help in this, users of wood should insist on home-grown wood being used wherever possible, and architects are especially asked to see to this when specifying for buildings.

The architect's difficulty in regard to the use of home-grown timber for building purposes is the lack of "availability" due to the defective organisation of the home-grown timber market, and to lack of "reliability" due to bad afforestation.

One of the chief points is the defective transport facilities of the country, and until this is thoroughly overhauled perfect organisation in other directions will be heavily discounted.

It is essential that home-grown timber should be put on the market in a mature condition, properly graded and in recognised standard scantlings marked with the year of felling, properly seasoned and of good quality, sold in yards which are well situated for transport, and in sufficient quantity to supply a reasonably large demand.

In the report on the condition of the roof of Westminster Hall the following conditions to be observed when obtaining oak were laid down:—

(a) The timber should be open grown oak in park situations, or grown as coppice and standard.

(b) The soil in which the timber is grown should be known, and should be a stiff, retentive loam.

(c) The species of oak should be pedunculata; sessile or durmast oak should not be used.

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(d) Timber should all be winter felled, and no spring or autumn felled oak should be used.

(e) The timber should be at least two to three years fallen before converted, and for great constructional purposes pieces of what is called the "prime log" only should be used, *i.e.*, the butt end of the tree from the root to the first out-throw of a big branch.

(f) If possible the oak should be seasoned for six months under cover after being cut to the scantlings in which it is to be used.

It is found that oak used for structural purposes, if cut from trees from which large horizontal branches spring, opens in serious shakes under stress.

Timber merchants as a rule can give no information as to the species of oak from which the timber has been cut. In addition they have no note of the soil on which it has been grown, nor would they appear to have very definite records as to the time of felling.

Reliable estimates should be made of the timbers available in this country for building purposes, and tables prepared for the next fifty years until timber planted now is ready for the market. These tables should be in the hands of every timber merchant. Emphasis should be laid upon the principle of the supply creating the demand rather than the demand creating the supply.

The question of soft woods is more urgent than that of hard woods. Forests are being depleted in Europe and America, and immature and dead timber is finding its way on to the market in increasing quantities.

The following is a brief account of the more important timbers of the Overseas Empire:—

### CANADA.

The best European timber for building purposes is the Scots Fir (*Pinus sylvestris*). It grows in the United Kingdom from 60 to 120 feet in height, and with trunks  $1\frac{1}{2}$  to  $3\frac{1}{2}$  feet in diameter. It is imported from Northern Europe under various names such as red and yellow deal, redwood, and deal with the names of various ports as prefix. The use of the word "fir" in connection with this wood should be discontinued, for it has nothing to do with the tree fir. As this timber is the standard on which the constants in our formulæ are based, and the scantlings of the various converted timbers are

cut in the search for new sources of supply for soft woods for building purposes, *Pinus sylvestris* has been used as the control for the comparison of strengths. Most of this wood comes from the Baltic and White Sea, and until the European forests are more cut it will be difficult for the Empire timber to compete in price, as freights from Eastern Canada in normal times are from 20 to 30 per cent. more than from the White Sea, 25 to 50 per cent. more than from Sweden, Petrograd and Riga. From Western Canada freights are more than double than from Eastern Canada.

The great factor in all questions of the use of a bulky and comparatively cheap article like constructional wood is the freight, and even though the Panama Canal has reduced the time a vessel with a Pacific wood cargo on board occupies in her voyage, the difference in the distance the wood has to come will probably curtail the use of it for a long time. When freights become more equal, then the Pacific mills will lay themselves out to cater for the English markets. At present from 1 to 2 per cent. of their output only comes to Europe.

With Dr. Chandler's permission I have taken the bulk of the following notes from his article on "Useful Timbers of the British Empire in Modern Building."

From Canada the principal soft woods are spruce, Douglas fir, Western hemlock and white pine.

**DOUGLAS FIR** (*Pseudotsuga Douglasii*, Carr.).—This timber is known under a variety of names—*e.g.*, Oregon pine, British Columbia pine, British Columbia fir, red fir, yellow fir, Douglas spruce. The tree occurs from Northern British Columbia to Mexico, and reaches its best development in southern British Columbia; in Canada it extends eastwards to Alberta. Its average height is from 150 to 255 feet, with a diameter of from 3 to 6 feet. Two forms are distinguished—viz., the mountain form, growing in the hinterland regions of relatively light rainfall; and the coast form, found in the lowland areas where the rainfall is heavier. The timber exported is said to consist almost exclusively of the coast form. The wood is one of the hardest, heaviest and strongest of Canadian coniferous timbers, and, when properly seasoned, is fine, sound and clear. The sapwood is narrow, and the heartwood varies in colour from light yellow to a decided yellow tinge. The number of annual rings per inch is commonly between twelve and sixteen (rarely less than eight), the dark summer ("autumn") wood

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being well developed and hard, while the spring wood is soft and much lighter in colour. The wood is usually of uniform growth and comparatively free from knots and resin.

The average weight of the dry wood is approximately 28 lb. per cubic foot.

**USES.**—Douglas fir has long been known in European markets under the name of Oregon pine supplies being chiefly derived from the United States. Recent years, however, have seen a great development in the lumber trade of British Columbia, and the timber of *Pseudotsuga Douglasii*, Carr., derived from that country, is now marketed as British Columbia Douglas fir. Although well known in Europe, experience with Douglas fir has been gained chiefly in the United States and in Canada. The timber is obtainable in very large dimensions, sticks 100 feet and over in length and 2 feet square being readily supplied by mills in British Columbia. This fact, combined with the strength, durability and lightness of the timber, and the ease with which it can be worked, renders Douglas fir of special value as a structural timber for railway cars, piling, docks, building timbers, bridge and trestles timbers, ships and barges. It is also suited for sashes and doors. As inside finish (e.g., in the form of veneer) Douglas fir is considered to possess special qualities in its hard surface, beauty of grain, freedom from warping and shrinking, and ability to take stains and varnish. It does not take paint well, as the grain shows through. There is in England a prejudice against Oregon pine due to the fact that the timber is not properly seasoned before shipment, and the long voyage caused the timber to have a bad appearance when it reached English ports. There is no reason why properly seasoned Douglas fir should not be as free from decay as any Baltic timber or pitch pine.

**SOUTHERN PINE.**—A term which embraces several species of timber, of which long leaf or pitch pine is the most familiar to English users. Most of the wood required in "timber" sizes 12 by 12 and 17 by 17 ("timber" is the trade name for square stuff over 11 inches square) used in Europe since the gradual falling-off of Baltic fir timber is southern pine. Loblolly is disliked generally. The disadvantage of pitch pine is its inherent tendency to shrink, even if planed some years after import. It is quite true that it is harder and stronger in tensile strength than Baltic fir. Owing to its length generally averaging

30 feet, it is a most useful timber for carpenters' work. Douglas fir can also be obtained in long lengths and is more regular in strength.

**BRITISH COLUMBIA SPRUCE.**—Also known as sitka, silver or tideland spruce. This timber (the largest of Canadian spruces), familiar in the English market for many years, is now one of the best known of Canadian timbers on account of its extensive use in the manufacture of aircraft during the war. The straight, even grain, toughness, elasticity, and lightness of the wood (20 lb. per cubic foot, kiln dried), together with the long, clear lengths in which it can be obtained free from knots and other blemishes, establish it with few rivals for aeroplane work. The timber is white, with a fine silver sheen, and is free from resin, and without noticeable taste or smell. It works easily and smoothly, does not warp, takes paints and stains well, and has good nailing qualities. The wood is used for a great variety of purposes in Canada and Western America—notably for the inside and outside finishing of buildings. Only the finest selected timber is used for aircraft work, and the remaining material should find a ready market for building purposes mentioned above, for which the perfect qualities required for aeroplanes are not so essential.

**WESTERN HEMLOCK** is not so well known over here as it is in Canada. It constitutes 18·3 per cent. of Canadian commercial timber, and, like the others, grows to a large size. Even in Canada its good qualities and value are not so well known as they will be. For ordinary building purposes it is equally as useful as Douglas fir. It has 88 per cent. of the strength of its biggest brother, and is not so suitable for the heaviest type of construction, but it makes excellent siding, flooring, ceiling, scantling, inside joists, etc. For sash and door fixtures, turned stock, panelling, etc., it has exceptional merit.

Western hemlock is usually light in colour, and contains no pitch or resin. It dresses to a smooth, satin-like surface capable of taking a very high polish, and is not easily scratched. Sawn slash grain it shows a very handsome figuring. Western hemlock takes paint well, and for enamel finish is perfect. Edge-grain hemlock flooring has proved invaluable. It hardens with age, and there is an instance on the Pacific coast where it has been down for 50 years and is now so hard that it is difficult to drive a tack in.

As regards Eastern Canada spruce forms the bulk

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of the timber exported to this country, white spruce heading the list ; it is gradually taking the place of white pine, for which it is a good substitute for many purposes. It should be more extensively used in this country for carcassing and general construction work. Its weight is 25 lb. per cubic foot.

RED SPRUCE from Quebec and the maritime provinces is used for the same purposes, and is preferred for joinery. Weight, 32 lb. per cubic foot.

BLACK SPRUCE is the strongest and most durable of the spruces, and should find wider application in this country for carcassing and construction work generally. Weight, 28 lb. per cubic foot.

WHITE PINE.—This valuable timber, also known in this country as yellow or Quebec pine, stood second among Canadian timbers in 1919 both as regards production and value. Over 70 per cent. of the cut is obtained from Ontario. The wood is light, soft, straight-grained, free from resin and easily worked ; it holds nails well. Though not strong relatively, it is probably used for a greater variety of purposes than any other Canadian timber. Its chief uses are in construction work where strength is not essential. It is a favourite material for deck-planking, sashes, doors, and finishings, while the slabs and edgings resulting from conversion are manufactured into shingles and laths. Under the name of "cork pine" the wood is extensively employed in making matches. The cheaper grades are largely used for boxes and crates. In the United Kingdom white pine is well known as a most valuable wood for engineers' "patterns" on account of its even and uniform grain and easy working. It was formerly much more widely used in this country for general purposes, but American competition for supplies has considerably affected exports to this country. Weight, 24 lb. per cubic foot.

EASTERN HEMLOCK.—This timber (also known as "hemlock spruce" and "hemlock fir") stands high among Canadian timbers in point of quantity cut. It is much inferior to British Columbia western hemlock. The wood is reddish brown, fairly stiff, but rather harsh and liable to splinter ; it holds nails well. A large part of the production is used locally for frames of buildings, joists, rafters, boxes, crates, concrete "forms," sleepers and poles, and for other purposes where a first-class wood is not essential.

## AUSTRALIA.

The principal commercial woods which have been exported from Australia include jarrah, karri, tuart and wandoo from Western Australia ; and ironbark, grey gum, tallow wood, blackbutt, spotted gum, blue gum, stringybark, ash and swamp gum, and turpentine mainly from New South Wales and Tasmania. Many of these woods are well known in this country and in other parts of the world (notably South Africa and India), where they have been used for piling, heavy construction work, railway sleepers and wood paving. Other timbers—*e.g.*, black bean, blackwood or fiddleback, rosewood, silky oak—are also highly valued for decorative purposes, though not so well known. It is claimed that the most distinguishing physical property of Australian hardwoods is their durability under the most adverse natural and artificial conditions.

## EUCALYPTUS WOODS.

JARRAH is restricted to the south-western section of Western Australia, and in this country is probably the best-known timber of the Commonwealth. It varies from light brick-red to dark red, is straight grained (sometimes wavy), splits easily in the direction of the grain, is of medium hardness, and works easily and well ; it is occasionally figured. The wood, which is used extensively in Australia and elsewhere for bridge, wharfe and house construction, railway sleepers, telegraph poles, and in all branches of carriage and wagon work. It has been largely exported to India and South Africa as railway sleepers, and in this country is well known for construction work, and as paving blocks, though for the latter purpose it is not so satisfactory under present conditions as Baltic timber. It is a fine cabinet and furniture wood, and is an admirable material for high-class joinery, such as window frames, doors, staircases, etc. It must be well seasoned, however, or joints are apt to gape. Weight, 51 lb. per cubic foot.

KARRI is also a Western Australian timber. It is often difficult to distinguish from jarrah, but it is considerably stronger than that wood, chiefly on account of the interlocked grain, which also renders it more difficult in working ; usually it is also lighter in colour. Karri is very suitable for bridge girders, beams, joists, etc., and has been largely

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used in England for railway-carriage scantlings and telegraph-pole arms. It is fire resistant, and can be obtained in very large sizes. Weight, 58 lb. per cubic foot.

SYDNEY BLUE GUM, a native of New South Wales and Queensland, yields a hard red timber of medium weight (46 lb. per cubic foot) which should be more widely known in this country. It is straight grained, open, easy to work and durable, and gum veins are rare. It is used more particularly in coach and wheelwrights' work, and to a less extent in building construction, shipbuilding, paving blocks and sleepers.

STRINGYBARK, which occurs in all the eastern States and Tasmania, has been used in many parts of the world for sleepers, piling and heavy construction work. The wood is fissile, moderately hard and tough, and of a pale brown colour. The sap-wood is liable to attack by borers and should be rejected. In Tasmania the timber is used extensively for joinery, cabinet work and internal fittings, for which purpose it is well suited. Weight, 46 lb. per cubic foot.

"ASHES."—The timbers furnished by this group resemble in many respects those of the genus *Fraxinus* (ash). Several valuable timbers are concerned, of which the best known is the mountain ash or Tasmanian oak, occurring in New South Wales and Tasmania. In its strength, resilience and bending properties the wood is very similar to the English ash, for which it forms an excellent substitute. In New South Wales this timber is much valued. In Tasmania it is largely used for furniture, office fittings and decorative work, and should be of interest to motor-body builders. Weight, 41 lb. per cubic foot.

### OTHER HARDWOODS.

BLACKWOOD, obtainable from all the eastern States, is a decorative wood reddish-brown to dark brown in colour, with golden brown bands, and often a curly figure and mottling; the "fiddle back" variety has striking parallel dark stripes. It finishes well with a satiny sheen and takes a good polish, and is a magnificent timber for cabinet work. It is extensively used locally for internal fittings of railway carriages, shops and offices for furniture and similar purposes, and is well known in this country. Weight, 47 lb. per cubic foot.

RASPBERRY JAM WOOD, a very hard, rich crimson or purplish wood, with an odour of raspberries. It has a close smooth grain, and is excellent for turning and ornamental work, for which purpose it should be more widely known. It has been used locally for posts and other outside work on account of its durability, but it is too valuable for such a purpose. Weight, 62 lb. per cubic foot.

BLACK BEAN, occurring in New South Wales and southern Queensland, is another fine cabinet timber of moderate hardness. It is of various shades of brown, with dark stripes and mottling, is straight-grained, planes easily with a smooth surface and polishes well, but requires careful seasoning. Employed locally in all forms of cabinet and decorative work, doors, etc. Weight, 47 lb. per cubic foot.

SILKY OAK.—Five woods are stated to be marked in Sydney as "silky oak." Important varieties are derived from *Orites excelsa*, R. Br., and *Grevillea robusta*, A. Cunn., the timbers of which are similar. Both timbers are strong, durable and light-coloured, with a grain and handsome flecked figuring ("slash") resembling oak. They are suitable for office and shop fittings and for general joinery work.

### CONIFEROUS WOODS.

Australia possesses few if any coniferous soft-woods available in sufficient quantities to warrant any considerable export trade after supplying local needs. A number of indigenous "pine" timbers, however, are utilised in the Commonwealth, the following being the more important :—

HUON PINE, restricted to Tasmania, yields probably the finest soft-wood on the Australian market. It is pale yellow, fairly close and straight-grained timber with little figure. It has excellent working properties, and is used locally for every description of joinery and cabinet work. Weight, 33 lb. per cubic foot.

KING WILLIAM PINE, another Tasmanian timber, produces a soft, pale-pinkish timber, somewhat resembling Californian red-wood in appearance and properties. It is specially suitable for mouldings, skirtings and similar forms of joinery where strength is not essential. Weight, 21-24 lb. per cubic foot.

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### BRITISH NORTH BORNEO.

There are large areas of virgin forest in British North Borneo, and recently the exploitation of these forests has been developed on modern lines.

The woods that are suitable for building are :—

**RED SERIAH** (*Shorea Spp.*).—This can be obtained up to 80 feet long and 5 feet diameter. It varies from pale pink or yellow to dark red, possesses a more or less cedar-like odour, and is easily worked. Weight, 25 to 40 lb. a cubic foot.

**WHITE SERIAH** is useful for light construction work. The weight is 35 to 40 lb. a cubic foot.

**KRUIN**.—Can be obtained in clear lengths up to 80 feet and diameter up to 4 feet. It is a strong and stiff wood, and will probably become the most important constructural wood of the country. Weight, 40 to 50 lb. a cubic foot.

**SELANGAN BATU** is another excellent wood for all constructural purposes. Weight, 52 to 65 lb. a cubic foot.

**MIRABAU** is a very hard and heavy, coarse-grained, dark yellowish-brown wood. Weight, 48 to 75 lb. a cubic foot. It is used for all kinds of high grade construction work on land.

**KAPOR**, or Borneo camphor wood, is good for constructural work, but it is said to be subject to dry rot, and if the tree has not been tapped for camphor it is useless.

All these timbers are liable to decay if in contact with the ground, but if properly protected they are very strong and durable. In the trade these timbers are known as cedar and teak ; this is very confusing, as they have no relation to either of these woods. The following are the equivalent trade names :—

Red Seriah ..	..	..	Red Cedar.
White Seriah ..	..	..	White Cedar.
Salangan Batu ..	..	..	No. 2 Borneo Teak.
Selangan Kacha ..	..	..	Prime Avera.
Mirabau ..	..	..	No. 1 Borneo Teak.
Kapor (camphor)	..	..	Burma Teak.
Kruin ..	..	..	Borneo Teak.
Oba Sula ..	..	..	Mahogany.

### INDIA.

Apart from teak, overseas timber exports from India have been relatively small. The greater part

of the out-turn of timber is used locally and hitherto has been supplemented by large imports, of which a considerable proportion (chiefly coniferous soft-woods) is derived from Europe. It seems probable, however, that with the improved means of extraction and transport and satisfactory seasoning and treatment of the woods produced, the greater part of the needs of the country could be supplied from local forests (notably those of Burma), and leave available a surplus of valuable "jungle-woods" (*i.e.*, timber other than teak) well suited to the requirements of overseas markets. This question is engaging attention, and it is interesting to note the statement that fully 85 per cent. of the timber purchased by the Indian Munitions Board during the War for military purposes was the produce of the country. Hitherto, Indian timbers have remained little known outside India. In this country, in addition to teak, East Indian rosewood or blackwood, Andaman padauk, Eng, and Moulmein cedar are the best known ; while less familiar timbers are East Indian walnut, gurjun, pyinma, Burma padauk, and thatka or Moulmein mahogany. In America, teak, Andaman padauk and rosewood are well known, and East India walnut, also known as koko or kokko, black chuglam, white chuglam and Andaman marble-wood have also been imported. There would appear to be little doubt, however, that, provided the woods can be exported in fair quantities and at a reasonable price, the intrinsic merits of a considerable number of Indian woods would secure for them a valuable market in this country. Mr. A. Howard has recently introduced several of these and other interesting woods into the country.

**TEAK**.—This wood is too well known to need detailed description.

**ENG or IN**.—This valuable Burmese wood, together with the next three species described—viz., gurjun, thingan and sal, belongs to Dipterocarpaceæ—one of the most important of timber-yielding trees in the East. The wood is closely allied to Siamese yang, and has been known in this country for many years, and used to a considerable extent for cheap furniture. Unfortunately, it has frequently been marketed as Eng "teak," causing disappointment to users of true teak, from which Eng is quite different. The heartwood is red to red-brown, with a strong aromatic smell when first cut. The wood is durable, hard and straight-grained, with a

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firm, close texture which renders it very suitable for flooring. It is excellent for interior decorative work (panelling, etc.), and good results have been obtained when using it for heavy indoor constructional work. The timber, however, must be well seasoned, and is not recommended for outdoor work. Nails cause the production of a black stain when the wood is exposed to the wet, as in the case of oak. In India Eng is largely used for building purposes, boats, carts and furniture. Large supplies of the wood are available. Weight, 54 lb. per cubic foot.

**GURJUN.**—This is an important timber of Burma, and has been exported in considerable quantity to Calcutta from the Andamans, where large supplies are available ; it is also known in this market. The wood is pale, reddish-brown, moderately hard, and oily. It is used locally for planking and packing cases, and experiments are being carried out in India as to the suitability of the wood for railway sleepers after antiseptic treatment. It is one of the best woods for parquet flooring, and can be most successfully employed for panelling. Weight (average), 50 lb. per cubic foot.

**SAL.**—This is one of the most important Indian timbers, and on account of its strength and durability is in great demand locally for railway sleepers, rolling stock, building purposes, etc., but on account of the local demand there is little likelihood of supplies being available for export in commercial quantities in the near future.

**ANDAMAN PADAUK.**—This beautiful timber, also known as Andaman redwood, deserves to be more widely used in this country, where its fine qualities are by no means fully recognised. It is restricted to the Andamans. The outstanding characteristic is the striking colour, which varies from deep crimson and brilliant red to brown, sometimes streaked with dark brown or black. The best coloured logs constitute only a small portion of those cut (about 5 per cent.), but it is estimated that approximately 70 per cent. of the logs yield redwood of various shades fit for export ; the remaining 30 per cent. consist of "off-coloured" timber, which is fully equal to the best logs except in colour. The wood is very strong and durable, with a fine hard, smooth texture. It works well, does not warp or split, and takes a remarkably fine polish, which well repays the labour spent upon it. When worked in delicate mouldings, however, the finer members are inclined to chip.

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**BLACKWOOD.**—This valuable timber, also known in this country as East India or Bombay rosewood, is a handsome, dark purplish wood with black streaks. It is very hard and durable, somewhat difficult to work, but takes a fine smooth polish. In India blackwood is extensively used for furniture, cabinet work, panelling, carving, joinery, carts, and for ordnance purposes ; as well as for tool handles, brush backs, musical instruments, turnery, etc. The wood is exported to Europe and America for furniture and cabinet making, but in this country its use is now practically confined to the pianoforte trade. It deserves much wider application. Weight, 50 lb. per cubic foot.

**MOULMEIN CEDAR.**—This timber, also known as toon, red cedar and thitkado (Burma), is exported to Europe from Burma, and is well known in this country, being familiar as one of the woods used for making cigar boxes. It is also obtainable from other parts of the Empire—*e.g.*, Australia. The soft, fragrant wood is of a rose to dull red colour, and resembles an open-grained mahogany in texture and general characteristics. It works to a smooth shiny finish, and takes a fine polish, but requires considerable previous filling. The timber is durable under cover, does not split or warp, but is apt to be affected by large variations of temperature and moisture. The wood is in great demand in this country, and fine logs frequently obtain high prices. It is a valuable wood for furniture, cabinet work, panelling and cigar boxes, and in India additional uses are for boats, carving, oil casks, etc. Weight, 35 lb. per cubic foot, but variable.

**PYINMA.**—The chief timber of Assam, Eastern Bengal and Chittagong, and one of the most important timbers of Burma, where it is available in fair quantity. It is lightish reddish grey to olive-brown in colour, hard, durable, and with a straight grain. It works easily, gives a good surface and takes a fine polish. The wood is used in India for many purposes where strength and durability, combined with lightness, are required. It has been imported occasionally into this country, and has been recommended for carriage building, furniture and panelling, for which it would appear very suitable. Weight, 40 to 45 lb. per cubic foot (Gamble).

### WEST AFRICA.

Practically the whole of the timber hitherto exported from British West Africa has been sold as

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" mahogany," though certain other woods—*e.g.*, iroko or West African teak, African walnut, African padauk—are more or less familiar to a section of the timber trade, though the majority of these woods remain practically unknown to timber users in this country. It is interesting to note that before the war West African timbers were far more widely used and appreciated in Germany than in the United Kingdom. At the present time, however, there are indications that the merits of selected West African woods other than " mahoganies " are receiving recognition in this country, and it is probable that, under favourable conditions as to freight, felling dues and forest transport, these timbers will find a regular market in this country for a variety of useful purposes.

**MAHOGANIES.**—The " mahoganies " derived from West Africa comprise several distinct botanical species of woods, which in appearance and practical qualities resemble the true mahogany of the West Indies sufficiently closely to be accepted and classified by the trade as mahogany. The best of the West African mahoganies are very valuable woods, and hold a high position in the market on account of the large sizes and quantities in which they are available and the magnificent figure which often characterises them. The trade in West African mahogany has been built up chiefly during the last twenty-five or thirty years, and for some time past the greater part of the enormous consumption of mahogany in this country has been of West African origin.

" Lagos " mahogany closely resembles Honduras mahogany in colour and general qualities. Formerly it was the best of the African mahoganies marketed, and many finely figured logs were regularly obtainable. Supplies of excellent wood are still shipped, but the export from Lagos has diminished in recent years.

The " Benin " wood is of very fine quality, and is especially useful for panel work on account of the large size of the logs. It resembles Lagos mahogany but is of superior toughness.

" Sapele " mahogany is also obtainable in large sizes, and figured logs are common. Hitherto the wood has marketed chiefly to Germany, where the well marked stripy " roe " rendered it very popular for cabinet making. The wood, however, frequently possesses a strong cedar odour, which in this country has been held to be a disadvantage. A

more serious defect is the common occurrence of ring-shake in the logs, and the liability of the wood to warp. The former defect may possibly be overcome by special methods of felling, and it is known that the warping can be avoided by using carefully seasoned timber cut on the quarter. The Imperial Institute Committee are making investigations with regard to this tendency to ring-shakes.

**AFRICAN TEAK.**—This splendid hardwood, also known as Iroko and Odoum, is one of the most valuable timbers in West Africa. It is extensively used locally for all kinds of construction work (including general carpentry, joinery and furniture), and is regularly imported into this country in small quantities from Nigeria and the Gold Coast, the best qualities coming from Benin (Nigeria). The wood is usually sold as " African teak " and also as " African oak "; the latter name, however, is incorrectly applied, the source of original African " oak " being *Oldfieldia africana*. In spite of its trade name, African teak is not related to true teak, and bears little resemblance to that wood in appearance and general features, the absence of the characteristic oiliness of teak being a notable point of difference. The wood varies from pale yellow-brown to dark brown, has a good appearance, and is strong, moderately hard, and very durable. When well seasoned it does not warp. It saws and planes well, but being somewhat cross-grained requires care in finishing, and takes nails indifferently. The grain is often somewhat open, but is handsome when polished. The wood is well adapted for all purposes where a strong, durable wood of good appearance is required, and should receive far more attention in this country. It is excellently suited for doors (inside and out), window sashes, sills, treads and staircases, and probably possesses a considerable degree of fire resistance. The wood should be most useful for interior finishing, joinery, cabinet work, laboratory benches and fittings, wagon building and wheel felloes.

### BRITISH GUIANA.

**CRABWOOD OR BRITISH GUIANA MAHOGANY.**—This valuable timber, which belongs to the mahogany family, deserves far wider attention in this country, being suitable for many purposes where medium qualities of mahogany are employed. Two varieties are stated to occur—viz., " red " (or highland) crabwood, and " white " (or lowland)

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crabwood, but so far it has not been possible to detect any botanical distinction between the trees concerned. The former is darker in colour and of closer texture than the "white" variety. Red crabwood is a tough, moderately soft, lustrous wood, closely resembling mahogany and certain grades of cedar in colour and appearance. It has a moderately coarse, open grain, saws easily, takes nails fairly well, and is capable of a high polish. In planing, care is necessary, as the wood is sometimes apt to "pick up." The wood is largely used for building purposes in British Guiana, and is the favourite furniture wood of the colony. It is not unknown in this country, and has been exported in considerable quantities to the United States. It is a very useful cabinet and furniture wood, and is well adapted as a substitute for medium quality mahogany; it has been used with much success in the British Guiana Court at the Imperial Institute for show cases and ornamental construction work. Weight,  $38\frac{1}{2}$  to  $46\frac{1}{4}$  lb. per cubic foot (quoted by Stone and Freeman).

**RED CEDAR.**—This is the well known "West Indian cedar," commercial supplies of which are derived from several parts of the West Indies. It should not be confused with white cedar or Warakuki. British Guiana red cedar has a fairly coarse grain, but works well and takes a good finish. The uses of this timber are too well known to need description.

**MORA.**—This timber deserves to be better known in this country. It is dark or reddish brown, often streaked with whitish or dark brown lines, and possesses a lustrous surface, which, however, is somewhat marred by a grey resinous deposit. The heartwood is one of the eight first-class shipbuilding timbers at Lloyd's, and is obtainable in logs 18 to 35 feet in length, squaring 12 to 20 inches. Two varieties are distinguished—viz., red and white mora—but it is not clear that the timbers differ in any important respects. Mora is a hard, heavy, strong, very tough and durable timber, fissile, hard to saw, planing well and smoothly, but nailing badly; it takes a fine polish. The wood is abundant in the colony, and is strongly recommended for shipbuilding, heavy construction work, and for railway sleepers; it is also worth trial as paving blocks. Weight, 57 to  $68\frac{1}{2}$  lb. per cubic foot.

**WALLABA.**—One of the most useful and abundant timbers of the colony. Several varieties are recognised, the chief being "soft" wallaba and itura wallaba. The heartwood of both these species is much used locally for posts and fencing on account of its great durability, and is also extensively employed for barrel and vat staves, shingles and firewood. "Soft" wallaba (so-called), however, is probably the most useful and abundant of all the varieties. It is a striking dark red wood, hard and heavy, and with a coarse but more or less even grain. The abundant resin causes a stickiness which is an unfortunate feature for many purposes, as is also the unpleasant smell, which, however, is not permanent. The wood splits easily, straight, and fairly cleanly, is moderately easy to saw, takes nails badly, and planes fairly well; it is troublesome to polish on account of "smearing." The wood has been suggested as suitable for paving blocks. Weight, 62 lb. per cubic foot (quoted by Stone and Freeman).

### BRITISH HONDURAS.

British Honduras is one of the most important timber producing countries of the Empire. A considerable number of valuable woods are found in the country, but the most important are the famous British Honduras mahogany, cedar and rosewood. Pine also occurs in considerable quantities and merits further attention.

**BRITISH HONDURAS MAHOGANY.**—This timber, which forms one of the best grades of mahogany in the market, is too well known to need detailed description. Formerly the wood was ascribed to the same botanical source as "Spanish" or West Indian mahogany, which was at one time common in several of the British West Indian islands. The Honduras timber is now generally recognised to be derived from a distinct but closely related species—viz., *Swietenia macrophylla*. The best qualities of Honduras mahogany are said to come from the limestone soils to the north of Belize. Those from the south of the colony, and especially from the Mosquito Coast, are somewhat inferior in density and grain.

**HONDURAS ROSEWOOD.**—This timber is closely related botanically to East Indian rosewood, and is much valued for furniture and cabinet work and for turnery, inlaying, etc. It is a dark, reddish or nut-

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brown wood, with an attractive grain and often streaked with narrow black lines. Weight, 68 to  $77\frac{1}{2}$  lb. per cubic foot.

**PINE.**—This pine is a characteristic feature of the "pine ridges" of the colony and occurs in considerable quantity. The wood is distinguished locally as "white" and "yellow" pine, though probably only one species of tree is concerned. It resembles pitch pine in appearance and weight, and is used on the colony to a small extent for building purposes, but it is said to be somewhat difficult to saw. The wood should prove very useful for railway sleepers if properly seasoned, and is well worth exploitation.

### Appendix A

#### IMPERIAL INSTITUTE ADVISORY COMMITTEE ON TIMBERS.

The Imperial Institute Advisory Committee on Timbers, under the chairmanship of Mr. H. D. Searles-Wood, F.R.I.B.A., comprises members nominated by professional and trade bodies including the Royal Institute of British Architects, the Timber Trade Federation, the Institute of Builders, the National Federation of Furniture Manufacturers, the Carpenters' Company, the Institute of British Carriage and Automobile Manufacturers, and the Empire Development Parliamentary Committee. The Committee is also associated with the Empire Forestry Association, who have appointed representatives to serve on the Committee.

The main object of the Committee is to examine in turn those timbers of the different countries of the Empire which are available in commercial quantities at reasonable prices, with a view to bringing to the notice of the trade and of users of timber in this country new or little known Empire woods which possess technical qualities that render them valuable for constructional or decorative purposes. In this work the Committee has been greatly assisted by the unique collection of Empire woods arranged in the Public Exhibition Galleries of the Imperial Institute; while such tests as are considered necessary by the Committee for determining the mechanical strength and working qualities of the timbers examined are carried out in the Timber Testing Laboratory of the Imperial Institute which is fully equipped for the purpose. The Committee also act in an advisory capacity with regard to the work on timber carried out at the Imperial Institute.

The Committee have now examined a large number of woods from several parts of the Empire. A considerable proportion of these woods have been found to possess qualities which render them well suited for various uses in this country, often as substitutes for better-known foreign woods. These woods have been made the subject of official reports of the Committee, several of which have already been published in the *Bulletin of the Imperial Institute*, while others are in course of publication.

The more important of these reports deal with woods from British Columbia, Eastern Canada, New Zealand, Nigeria, India and British North Borneo. As a result of the report on British Columbia timbers, B.C. Douglas fir, B.C. spruce and B.C. western hemlock have been included in the official specifications of H.M. Office of Works.

The following is a list of the more important woods examined by the Committee:—

#### BRITISH COLUMBIAN TIMBERS.

Douglas Fir	Western Yellow Pine
Silver Spruce	Western Larch
Western Hemlock	Western Red Cedar
Western White Pine	

#### EASTERN CANADIAN TIMBERS.

White Pine	Balsam Fir
Red Pine	Jack Pine
Spruces	Tamarack
Eastern Hemlock	Beech
Eastern Larch	Birch
Eastern Cedar	

#### INDIAN AND BURMESE TIMBERS.

Burma Padauk	Rosewood
Andaman Padauk	Sissoo
Sal	Thitya
Taman (Pyinma)	Ingyin
Haldu	Yamane
Eng	Taukkyan (Sain)
Pyinkado	Pinle Kanazo or Sundri
Thingan	Kanyin
Gurjun	Thitkado (Moulmein Cedar)

#### BRITISH GUIANA TIMBERS.

British Guiana Crabwood	Red Cedar
Mora	White Cedar
Wallaba	Determa
Silverbally	Dalli
Greenheart	Futi Futi

#### BRITISH NORTH BORNEO TIMBERS.

Red Seriah	Kapor
White Seriah	Selangan Batu
Kruin	Selangan Kacha

#### NIGERIAN TIMBERS.

Afara	Ogugu
Agba	Obobonufwa
Aligna	Obobonekhui
Okwein	Anamomila
Ekhimi	Ainyeran
Sapele Mahogany	Ekki
Opepe	Agboin
Arere	Abura
Emido	Mangrove
Ebo	

#### NEW ZEALAND TIMBERS.

Kauri Pine	Black Beech
Southland Beech	Rimu
Red Beech	

#### CEYLON TIMBERS.

Boxwood	Honduras Mahogany grown in
Wira	Ceylon
Etteriya	

#### BRITISH HONDURAS TIMBERS.

Pine	Salmwood
Santa Maria	Black Poisonwood
Banak	

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Appendix B  
CONJOINT BOARD OF SCIENTIFIC SOCIETIES  
TIMBER COMMITTEE  
STANDARDISED NAMES FOR TIMBERS

Suggested Standard Name	Scientific Name	Country of Origin	Names occasionally used which it is proposed shall be abandoned for the purpose of standardising nomenclature
<b>PINE.</b>			
Scots Pine . . .	<i>Pinus sylvestris</i> . . .	Nearly the whole of Europe, including Scotland, Northern and Western Asia	Baltic Redwood, Red Deal, Yellow Deal, Scotch Fir
Siberian Pine . . .	„ <i>Combra</i> . . .	Alps, Carpathians, N.E. Russia, W. Siberia	Combran Pine, Yellow Pine, Swiss Pine, Alpine Pine
White Pine . . .	„ <i>Strobus</i> . . .	Canada, Northern and Eastern U.S.A.	Weymouth Pine, Yellow Pine, Soft Pine
Western White Pine . . .	„ <i>monticola</i> . . .	British Columbia and Western U.S.A., from Washington and Montana to Central California	Silver Pine, White Pine
Canadian Red Pine . . .	„ <i>resinosa</i> . . .	Canada and Northern U.S.A.	Hard Pine, Red Pine
Bull Pine . . .	„ <i>ponderosa</i> . . .	Western North America, from British Columbia and Lower California, and N. Mexico	Yellow Pine, Big Pine, Pitch Pine, Red Pine, Heavy Pine
Lodgepole Pine . . .	„ <i>murrayana</i> . . .	—	Tamarack, Prickly Pine, Spruce Pine, Murray Pine
Loblolly Pine . . .	„ <i>taeda</i> . . .	South-Eastern U.S.A. . . .	White Pine, Black Pine, etc.
Hard Pine . . .	„ <i>rigida</i> . . .	Eastern N. America . . .	Pitch Pine
Short-leaf Pine . . .	„ <i>echinata</i> . . .	Eastern U.S.A. . . .	Carolina Pine
Pitch Pine . . .	„ <i>mitis</i> . . .	South-Eastern U.S.A. . . .	Pitch Pine, Short-leaf Yellow Pine
Manchurian Pine . . .	„ <i>Palustris</i> . . .	Eastern Siberia, Manchuria, Korea, Japan	Yellow Pine, Long-leaf Yellow Pine
„ <i>koraiensis</i> . . .			Siberian Pine, Corean Pine
<b>SPRUCES.</b>			
European Spruce . . .	<i>Picea excelsa</i> . . .	Europe . . . . .	Baltic White Wood, Deal, White Deal Spruce Fir, White Fir, Swiss Pine, Violin Wood
White Spruce . . .	„ <i>alba</i> . . .	Eastern Canada and North-Eastern U.S.A.	American White Spruce, Canadian White Spruce, Quebec Spruce, Campbelton Spruce
Black Spruce . . .	„ <i>nigra</i> . . .	North America from Alaska to Labrador and southwards from the North-Eastern U.S.A. to S. Virginia	American, Canadian Spruce, New Brunswick Spruce, St. John's Spruce
Sitka Spruce . . .	„ <i>sitchensis</i> . . .	Western N. America from Alaska to California	Mensica Spruce, Silver Spruce, Tideland or Western Spruce
Japanese Spruce . . .	„ <i>ajanensis</i> . . . or other if approved	Japan . . . . .	—
Siberian Spruce . . .	<i>Picea obovata</i> . . .	Siberia . . . . .	—
<b>FIR.</b>			
Silver Fir, Europe . . .	<i>Abies pectinata</i> D.C. . .	Mountains of Central and Southern Europe	Swiss Pine
Balsam Fir, U.S.A., Canada	„ <i>balsamea</i> , Hill	North America from Labrador to the Northern U.S.A. and Virginia	Silver Pine, Hudson Bay Pine, Canada Balsam, Balm of Gilead, U.S.A.
Oregon White Fir, Noble, Oregon, Wash.	„ <i>Nobilis</i> , Lindl. . .	Western U.S.A. from Washington to Northern California	Red Fir, Noble Fir, Larch, U.S.A.
Californian White Fir . . .	„ <i>concolor</i> , L. & C.	Western and South-Western U.S.A. and Northern Mexico	White Fir, Balsam Fir, U.S.A.
Japanese Fir, N. Japan, N.E. Siberia	„ <i>sachalinensis</i> , Wast.	Saghalien, Kurile Is., N. Japan	—
Douglas Fir . . .	<i>Pseudotsuga Douglasii</i> . .	Western N. America and N. Mexico	Oregon Pine, Douglas Pine, Red Fir, Yellow Fir, U.S.A., Columbian Spruce, U.S.A.

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Suggested Standard Name	Scientific Name	Country of Origin	Names occasionally used which it is proposed shall be abandoned for the purpose of standardising nomenclature
LARCH.			—
Europe Larch ..	<i>Larix europaea</i> , D.C. ..	Mts. of Central and Southern Europe	—
Northern Larch, W. Russia ..	„ <i>siberica</i> , var. of <i>L. deb.</i> ..	N.E. Russia and Siberia ..	Archangel or White Sea Larch
Western Larch, Rocky Mts. ..	„ <i>occidentalis</i> Nutt. ..	British Columbia and North-Western U.S.A.	Not known over here and therefore no popular description
HEMLOCK.			Hemlock Spruce
Canada .. ..	<i>Tsuga canadensis</i> , Carr. ..	Canada and Eastern U.S.A. ..	The timber of this tree is usually considered to be superior to that of <i>T. canadensis</i>
Western .. ..	„ <i>albertiana</i> ..	Western N. America from Alaska to California ..	Deciduous or Louisiana Cypress (both names are in use and correct)
CYPRESS.			White Cedar, Swamp Cedar, U.S.A.
Louisiana Cypress ..	<i>Taxodium distichum</i> , Rich. ..	Southern U.S.A. .. ..	Yellow Cedar, Sitka Cypress, Alaska Cypress
White Cypress, E. U.S.A. ..	<i>Chamæcyparis thyoides</i> L. ..	Eastern U.S.A. .. ..	Oregon or White Cedar
Yellow, Brit. Col., Alaska ..	<i>Chamæcyparis nastkaten-sis</i> , Lamb. ..	Western N. America from Alaska to Washington and Oregon ..	—
Port Orford Cedar, Oregon ..	<i>Chamæcyparis lawsoni-ana</i> , A. Barr. ..	S.W. Oregon to Northern California ..	—
ARBORVITÆ.			Red Cedar, Western Cedar
Giant, W. U.S.A. ..	<i>Thuyn plicata</i> , Den. ..	Western U.S.A. .. ..	—
SEQUOIA.			Californian Redwood or Sequoia
U.S. and England ..	<i>Sequoia Sempervirens</i> , Erdl. ..	California .. .. ..	—
REDWOOD .. ..	<i>Sequoia gigantea</i> , Ton... ..	California .. .. ..	—
WALNUT.			French, Italian, Circassian Walnut
European Walnut ..	<i>Juglans regia</i> , L. ..	South-Eastern Europe to the Himalaya ; North China and Japan ..	—
Black Walnut, U.S.A. ..	„ <i>nigra</i> , L. ..	Southern Canada and Eastern U.S.A. ..	American Black Walnut
Japanese Walnut, Kurimi ..	„ <i>sieboldiana</i> Maxim ..	Japan .. .. ..	White or Grey Walnut
BUTTERNUT, U.S.A. ..	„ <i>cinerea</i> , Linn. ..	Canada and Easter U.S.A. ..	—
LIME.			—
European Lime ..	<i>Tilia Vulgaris</i> , Mayne ..	Europe .. .. ..	Basswood, U.S.A.
American Lime ..	„ <i>Americana</i> , L. ..	Eastern U.S.A. .. .. ..	—
OAK.			—
British Oak .. ..	<i>Quercus pedunculata</i> ..	Europe, including the British Isles ; Caucasus, Asia Minor ..	Both trees common and timber of both trees is mixed indiscriminately in all these countries.
French Oak .. ..	„ <i>sessiliflora</i> Salisb. ..	„ ..	—
Austrian Oak ..	„ „ ..	„ ..	—
Riga Oak ..	„ <i>alba</i> , L. ..	Eastern North America .. ..	Mixed in this as exported are several distinct species of variable quality
American White Oak ..	„ <i>rubra</i> , L. ..	„ ..	The same remarks apply
American Red Oak ..	„ <i>primus</i> , L. ..	„ ..	Rock Oak, New York, sold as White Oak. Called Chestnut in England, but passed off sometimes as Oak
Chestnut Oak, U.S.A. ..	„ <i>velatina</i> Lamb ..	„ ..	Sold as Red Oak.
Yellow Oak, S. U.S.A. ..	„ <i>palustris</i> Muench ..	„ ..	Sold as Red Oak ; often described as Baltimore or Virginian Oak, often sold as Wagon Oak or Sill Oak

N.B.—None of the woods known as cedar are true cedars, and no true cedar wood is in general use in trade in this country. Lebanon cedar, large quantities of Algerian cedar, Cedras atlantis, were shipped to London for sale by the French Government recently, and further supplies are likely in future.—N.E.D. Algerian cedar and Deodar from Himalayas are the only trees which are the true cedar.

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Suggested Standard Name	Scientific Name	Country of Origin	Names occasionally used which it is proposed shall be abandoned for the purpose of standardising nomenclature
WILLOW. Goat or Withy ..	Salix alba, L. .. " cuprea, L. ..	Eastern Counties of England ..	There are a great many species and varieties of willow, of which the one known as <i>bat willow</i> is the most valuable for that purpose and the only one I know of which is known generally in the trade
ELM. English Elm ..	Ulmus campestris, L. ..	Southern England and possibly Spain	Often confused in trade as there are many varieties of which the red-wooded elm of the Thames and Severn valleys is best, and many varieties known under local names are not distinguished in the trade
Wych Elm ..	" montana, With.	Europe, including the British Isles; Caucasus, Asia Minor, North-East Asia	
Rock Elm, U.S.A. ..	" racemosa, Thomas	—	
White American Elm ..	" americana, L. ..	—	Soft Elm, U.S.A., here known as Soft Elm
BIRCH. American Birch ..	Betula spp. ..	Eastern North America ..	Various species are included in American Birch in commerce.
POPLAR. White, Europe ..	Populus alba, L. ..	Europe, North Africa, North and West Asia	Usually confused in England, where the grey alone is native and considered the best poplar wood, often called aspen or asp, which is a much smaller tree and inferior timber
Grey Poplar, England ..	" canescens ..	Western Europe, including the British Isles	Tree most used for poplar timber in England
Black Poplar, England ..	" nigra, L. ..	Europe, including the British Isles	French Poplar mainly, but there are many varieties. Unknown in the trade, but a very good timber of great size
Black Italian Poplar, England ..	" scotina ..	Morocco .. .. ..	
Black Cottonwood Poplar, Brit. Columbia ..	" trichocarpa, T. & C.	Western North America ..	
American Balsam ..	" balsamifera, L. ..	—	Balm of Gilead
Cottonwood Poplar ..	" deltoides, Marsh.	—	
TULIP TREE, U.S.A. ..	Liriodendron, tulipifera, L.	Eastern North America ..	Yellow Poplar, U.S.A. American Whitewood, Canary Whitewood, Canary Wood, Canary Pine, England. Rosewood, Scotland and England
ASH. European ..	Fraxinus Excelsior, L. ..	—	Several species, mostly inferior, are sold under the name of American Ash
American White ..	" Americana, L. ..	—	
MAHOGANY. Honduras ..	Some Mexican may have crept in	—	There are no fancy popular names of these. They are mostly known for what they are and so described
Nicaraguan ..	—	—	
Tabasco ..	—	—	
Guatemala ..	—	—	
West African ..	Admiralty getting most Nigerian	—	
LIQUIDAMBER, U.S.A. ..	Liquidamber styraciflua, L.	—	Satin Walnut, Hazel Pine, Sapwood, in England only, Redgum in America; now largely used as plywood
HICKORY .. ..	Hicoria ovata Mill. ..	Eastern North America ..	Shagbark Hickory and Shellbark Hickory

A great many different species from Africa are distinguished in trade by their port of shipment.

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### Discussion

The PRESIDENT : We have heard a very interesting paper, and one which will add a great deal to our information when we come to read it.

We have interesting and important guests with us to-night, and I have great pleasure in calling upon Sir Joseph Cook, High Commissioner of the Commonwealth of Australia, to propose a vote of thanks.

The Right Hon. Sir JOSEPH COOK, G.C.M.G. (High Commissioner for the Commonwealth of Australia) : It is a great pleasure for me to be here this evening to listen to this very interesting paper. I have heard to-night a great many things about Australian timber that I did not know before. That may very well be, because I do not pretend to be a timber expert, or anything of the kind. But I noticed that the lecturer left out of account some of our valuable timbers in Australia. He has told you a great deal, for instance, about teaks of various kinds and in various places ; and I would like to remind you that we have some very remarkable teak on the Northern rivers of New South Wales. One of its characteristics is that no white ant will touch it. It is, I believe, about the only timber known that the white ant will not eat in any circumstances. We have, also, on the North rivers in New South Wales a very large quantity of cedar. Perhaps it is all being cut down now ; I do not know. One of the troubles of new countries is that valuable timbers are burnt off in the process of clearing the land for the settler. Time was when there were very large forests of red cedar on the Northern rivers.

A good deal depends, I suppose, on what you have in mind when you speak of the relative values of timbers. I have, for instance, been very much surprised to-night to hear that the karri timber of Western Australia is superior to jarrah. It may be for building purposes, but not for others ; and here I speak from experience. I remember that when we were building the trans-Australian Line, which, as you know, is 1,000 miles from its commencement to Kalgoorlie, we had a controversy as to the kind of sleepers which were to be employed. One of our Ministers had decided that karri should be used. In order to make this karri suitable for railway sleepers it was necessary to Powellise it—I think that is the name of the process. We had a tremendous controversy in our Australian Parliament as to the wisdom of sleeping the railway line with so many millions of karri sleepers. It was said that jarrah was very much better for the purpose without Powellising or treating it any way. In addition to being Prime Minister at the time, I was Minister of Home Affairs, and charged with the construction of this railway. The selection of the timber was a compromise, and both jarrah cedars and karri were used ; and I am bound to say that the karri sleepers have turned out

much better than some of us expected. I rode over the line a little while ago, and was shown the position of the Powellised karri sleepers ; and although they had been down seven years, they appeared to be quite intact and thoroughly sound. The Powellising process had evidently prevented the white ant from getting into the timber. To-night I hear that karri is a superior timber to jarrah. I am not prepared to say it is not ; all I know is, that at the time the critics in the House insisted that jarrah was superior to karri.

We have heard to-night of a great many other woods, and it struck me while the lecturer was reading his paper that it may well be that you do not know all the woods in the Empire, simply because you have not had samples of them brought over here and have not used them. For instance, what about Queensland maple ? There is no finer looking furniture in the world than that made of our Queensland maple. And then there is the blackwood. I am glad to hear its qualities extolled to-night. If you have ever seen a suite of blackwood furniture you will, I think, agree there is nothing more beautiful. The trouble is that when you buy furniture in London you have only mahogany and rosewood and one or two other timbers to choose from. You go in for everything here that is solid and substantial, rich in colour and all that kind of thing. I think it is very much like your character, solid and enduring.

We have been taken all over the world to-night, and have heard all about the different timbers. I hope sincerely that you will keep in mind Australian timbers. If we have only been sending you our hard woods to pave your streets with it is not because we have not other kinds. The country is such a distance away that I suppose the freights are an obstacle. We have splendid woods, and I hope you will not forget to use them sometimes. This is a great Empire of ours. We have heard to-night that it is full of timber. It is full of nearly everything else that the Empire wants for its sustenance and its continuity. If ever there was an Empire in the world which could afford to be self-contained, it is this mighty confraternity of nations of which this Empire has been built up. Mr. Searles-Wood has shown you to-night that every conceivable kind of timber grows throughout this wide, broad, far-flung domain of ours. Therefore I shall hope to see a policy which is framed not upon hard economic considerations only, though not neglecting that aspect of it, but upon considerations which have to do with the solidarity, permanence and mutual helpfulness of every part of our Empire in relation to every other part. These lectures upon our Empire resources minister to the feeling that the trading of the Empire, as well as other things, should be kept as much as possible within the confines of the Empire.

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The point I want to make before I sit down is with regard to afforestation. I remember that when the war was over and the question of war debts came to be considered, one of the oldest, wisest and most experienced men on timber in this Empire came to me with this proposition. He said, "If you want to pay the debts of the Empire in a way that will not hurt anybody, carry out a scientific system of afforestation throughout the Empire." He said, "In Australia you can pay your war debt, which amounts to nearly 400 millions sterling"—nearly as heavy as yours, certainly proportionately as heavy—"by a system of afforestation. Cultivate your soft pine woods"—those that we now send you in the shape of butter-boxes, fruit-boxes, etc.—"then," he said, "in thirty years you will have paid off your National Debt." There is plenty of room in this Empire to grow enough timber to pay off the debts of the Empire; and I believe it could be done.

I am glad to be here to-night, Mr. President, and to have the privilege of moving a vote of thanks to the lecturer, who has given us such a good glimpse of the possibilities of the Empire and its resources.

Professor WYNNDHAM R. DUNSTAN, C.M.G., F.R.S. (Director of the Imperial Institute): It gives me great pleasure to second the vote of thanks.

Before I make any remarks on the subject of the paper, I should like to say that I am sure everybody in this room feels what a great pleasure it is to have amongst us this evening Sir Joseph Cook, who has only recently arrived, not to pay his first visit to this country, but perhaps his longest one. All have heard with pleasure the very broad, statesmanlike view which he has given us of our Empire. His presence here to-night, as well as the remarks he has made, seem to indicate that he is ready to put his shoulder to the wheel to help us in realising a great ideal.

I think Mr. Searles-Wood has done a great service in bringing to the notice of architects the fact that there are, in the various countries of the Empire, numerous woods which are suitable for building purposes. It is also to be added that there are, as Sir Joseph Cook said, woods of very great beauty which ought to be known to architects on account of their decorative possibilities. We have come to regard almost as a truism the saying that we ought to develop to the utmost extent the resources of the Empire in timber; but surprisingly little has been done. The lecturer has told you that, in two very important public buildings which are now approaching completion, the principal timber employed is not English or British, but has been obtained from abroad and this in the year 1922, after all the talk that we have heard about the importance of using materials derived from our own countries! This is a problem which in its detail is exceedingly complicated. There is a number of difficult factors concerned which require very careful study. Timbers which I think ought to be

in very large use are rarely used, or not at all. When we look into the facts we find that the amount of timber available is not definitely known; the cost of production has not been accurately ascertained, and in many instances transport facilities are very difficult. The result is that the merchant on this side is only prepared to offer quite a nominal price for a wood when he knows practically nothing as to the possibilities of getting regular supplies of it. Again, we have the difficult question of freight, which operates, I am sorry to say, against the use of a number of timbers which are perfectly suitable for building purposes. But when they have to be brought a great distance it is difficult for them to compete with timbers which are produced nearer home. The result of this is, that in a number of countries valuable timber is being put to quite unimportant uses, and in many cases is being burned as fuel.

The question is, what can be done? It is quite clear that the existing information requires to be brought together and carefully examined, so that the true facts can be ascertained. It is equally obvious that a great deal of new information is needed and will have to be procured. Mr. Searles-Wood is the Chairman of a Committee which we all hope will be able to do a great deal in this direction, because it has limited its field of work. The subject of timber for building, decorative and other purposes is a great one, even if you limit it to the timber which is grown within the Empire. This Committee has set to work to select a few of the most important timbers from the different countries, to find out definitely what supplies exist, at what cost they can be extracted, and for what purposes their properties render them particularly suitable. As the Committee consists of architects, builders, merchants and manufacturers, it ought to be in a strong position to do this work. It has, at the Imperial Institute, a very fine collection of the timbers of the Empire to start with; it has an expert staff, it has means of testing, and it has means of communication with overseas. It has already done much valuable work; it has been the means of bringing into further use several important timbers, and I have no doubt that, as it proceeds from country to country, it will do something to add to the somewhat meagre collection which you see on the table this evening.

There is one other subject to which Mr. Searles-Wood alluded—it is that of afforestation; he particularly drew attention to that in connection with the growth of our English timber. But afforestation is equally important to the countries overseas. We have to remember that economy and thrift are equally as important in connection with timber as in other matters, and that supplies, which look at the moment to be exceedingly abundant, disappear in time if they are constantly being drawn upon. Therefore they ought to be

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properly conserved and looked after. The Committee over which Mr. Searles-Wood presides is working in co-operation with the newly formed Empire Afforestation Association, from whose work much is expected throughout the Empire.

I am rather tempted by the example of Sir Joseph Cook to say one word about another aspect of timber usage. It seems to me evident that we must learn to use timber only for constructional purposes and for decoration. At the present time it is widely used for quite inferior purposes, of which perhaps the most important is the manufacture of paper. Paper is responsible for the consumption of a very large amount of timber which, if it were allowed to grow to maturity, would be of enormous value for building and other constructional work. I am one of those who hope that in the future the consumption of timber will be limited, and that it will finally be altogether superseded by the use of other materials which are equally effective for the manufacture of paper and which, at any rate in this country, are not required for constructional purposes. I refer in this connection first of all to bamboo, which is very abundant in the tropics, and can be produced over and over again. A number of similar reeds and grasses are only now gradually coming into use, because manufacturers, even of paper, are conservative and do not like to employ wholly new materials. There is very good evidence that these other materials, especially bamboo, will in future play a very important part in the making of paper. If that occurs, there ought to be available very much more timber of the sort the architect and the builder want.

I would like to say with what pleasure I have been here to-night to listen to Mr. Searles-Wood's paper, and I wish to express to him my obligation for the great trouble he has taken to collect the large amount of data, which I am sure will be very valuable for reference in your JOURNAL.

Hon. Sir EDGAR WALTON (High Commissioner for the Union of South Africa) : You have surprised me by calling upon me, Sir. I am afraid I cannot contribute much to the subject from my South African experience. I think that what has happened in most countries happened there, too. We commenced with deforestation, and then, after some generations of deforestation, we embarked upon a policy of afforestation. Many of our indigenous woods are highly valuable ; we have not yet developed them to what we may call a commercial extent, that is, the extent which the lecturer has spoken about to-night, when it is possible to put on the market in the United Kingdom a regular supply on which timber merchants and others feel justified in spending capital. Then in South Africa we have our diamond mines, gold mines, and coal mines, which create a great demand for timber for the use of pit-props. One of the difficulties of our Forestry Department to-day is to

control the agents of these mining companies when they get to work on our forests. We are now adopting, I think, more and more largely, a system of using in the mines cement props instead of timber.

I fully endorse the remarks which have been made by speakers to-night as to the vast importance of this question, and I am very glad to find that your Institute is considering it from the Empire point of view ; so that when one in your profession is called upon to select material for the construction of buildings, he will in the first instance, if possible, see if he can get it from within the British Empire before beginning to exploit other fields. This has been done in the past, no doubt, but not so much as it ought. I have not found, in different parts of the Empire, that there is always a keenness to say "We are going to have British goods and British manufactures, and that is a principle to which we will adhere." It is a principle, it seems to me, that we as British people ought to adopt in the present confused and unsettled state of world economics. We ought to stand by it and refuse to be led aside by tempting offers of other materials which will go to the benefit of other people.

I have very much pleasure in adding my thanks to those of other speakers to Mr. Searles-Wood for an extremely interesting and instructive paper.

Mr. H. O. WELLER (Director of Building Research, Department of Scientific and Industrial Research) : We have had several papers read in London recently on the timbers of various parts of the Empire, but I think there has not before been anything so inclusive as this.

I would challenge one remark—that it is essential the timber resources of the United Kingdom should be increased. Is that really so important ? If we get our timber from the Empire, I do not think it matters much what is grown in the United Kingdom, because the area is small and the quantity of any particular kind of timber which can be grown must also be small. There is the saying, "British oak for British ships" ; but I think many of our old ships were built of teak from India.

With regard to various sections of the Empire, Canada sets a great example in a pamphlet on Douglas fir ; it is a model for others to follow. When you look into the information given by other Governments, it is often hardly worth having ; they do not tell much and particularly they omit to tell us how to differentiate one wood from another quickly in practice, in cases where you cannot tell by simply looking at an ordinary specimen. Points like that are practically never to be found in Government publications.

With reference to Australian timbers, in India we have used Australian timbers during the last twenty years, and I agree with Sir Joseph Cook in saying that jarrah is much better than karri. There again it is difficult to tell one from the other. I heard an old en-

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gineer years ago giving some information on that point, which I have not seen set down. He said you can distinguish jarrah and karri by burning a chip ; the ash from jarrah is black, that from karri is white. Jarrah is a useful timber for sleepers, for bridge-timbering and piles. In sea water karri is particularly bad for piles, because borers attack it.

I have had experience of many other Australian timbers. Blue gum is good. Black butt is a good timber for sleepers. I had under test on my track, twenty or thirty Australian timbers, all branded "True to name" by the various Australian Governments. We tested these for two or three years, and picked out some which were better than others ; but when we gave orders for them we met a difficulty ; we could not get those we specified, and had to take mixed hard woods. Incidentally, it is a great point in favour of Australian woods that you can get them branded "True to name" by Government Inspectors. I do not think that is so with any other Colonial timber. This is a point which should be remembered in buying Indian timbers. The native merchants are adepts at faking one timber to look like another, therefore it would be as well to insist on some kind of guarantee when buying, not only from India, but from the East generally. I was told by a big timber merchant in London that he had been taken in by Manchurian oak. He found some of it was ash.

We tried Manchurian oak in India just before the war ; after trials we finally rejected that timber in India. After the war, I was astonished to see it being used in England. It is not nearly so good as Austrian oak. In the log it shakes and splits, and as a sleeper it breaks off short. It is not good for constructional timber ; as an ornamental timber it may be a success, but I doubt it.

Deodar has been omitted from the list of Indian timbers. It is a true cedar, and it is one of the best timbers in North-West India. It has an essential oil in it, and white ants do not touch it. Regarding teak, we have been used to specifying "Moulmein," but I believe that the best teak now comes from Java. That is not in the British Empire ; if you want to use a British Empire wood which is as good as teak, use padauk. The lecturer truly says that sal is a most important Indian timber, but it is a constructional timber only ; you cannot get a good surface on it owing to its twisted grain. Moreover, there is such a demand for it in India that I don't think you could bring it to England at a reasonable price. We have had to go to Australia, owing to the shortage of sal, in order to get sleepers.

Padauk is, it is said, restricted to the Andamans. But there is a Burmese padauk which is almost indistinguishable from the other. It is a very fine timber, and can be obtained in any reasonable length and width of plank.

With regard to rosewood for ordnance purposes, I

think the lecturer is "pulling our leg." What happened in India in regard to rosewood used for ordnance purposes was, I believe, that someone in South India persuaded a loyal rajah to let the Government of India have a few hundred tons of rosewood at a cheap price to make into artillery wheels. It was found very unsuitable for that purpose.

With regard to substitutes for timber in the manufacture of paper, bamboo has been tried, but bamboo is not cheap, and there are other materials available. For instance, we recently had a sample of waste jute-stick from Bengal made up successfully into a pure white cellulose, suitable for paper-making.

In conclusion, I compliment Mr. Searles-Wood on his very interesting paper.

Mr. W. E. VERNON CROMPTON [F.] : I would like to associate myself with the vote of thanks, for two reasons. Speaking as an architect, I think Mr. Searles-Wood has given us some valuable information, which will be published in our JOURNAL for reference for practically all time. Secondly, for the last five years I have been associated with Mr. Searles-Wood on the Committee at the Imperial Institute, and the conclusion I have come to is, that we have not only done some very important work, but what I should call pioneer work, because it is breaking up new ground. We have to find out what timber is available before any further step can be taken.

If I may make one or two criticisms in reference to the paper, I would say I am rather surprised to hear what Mr. Searles-Wood says about Turkey oak, a sample of which is on the table. I do not think it is such a bad wood as the lecturer would have us believe. I have used Turkey oak in pergolas for some years, and it has stood very well. Again, Mr. Searles-Wood is rather down on English oak ; but the difficulty we have in this commercial age in regard to English oak is the method of craftsmanship. It requires very careful craftsmanship and it requires time, which cannot often be given to it in these days.

With regard to Oregon pine or Douglas fir, Mr. Searles-Wood draws a distinction between the coast tree and the hinterland tree ; but the special distinction which architects should remember with regard to Douglas fir is the difference due to latitude, Canadian fir being better for our purposes than the United States variety, which grows very rapidly and is not such a good tree. Therefore in our specifications we should specialise particularly Douglas fir, and see that we get a Canadian, not a United States, timber. I agree with what Mr. Searles-Wood says in regard to Canadian spruce. In the South of England there seems to be a prejudice against using spruce for constructional purposes, and instead we use yellow Baltic timber. The prejudice does not however prevail in the North of England.

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With regard to the work of the Committee with which I am associated, it seems to me that if, in the tests of these timbers, which will probably be published later, a standard could be set up, it would be a great boon, instead of finding it stated as we do now that certain timbers can bear certain weights per lb. and others so much per ton.

Mr. R. L. ROBINSON, O.B.E. (Forestry Commission) : I have been very interested in hearing, in this discussion, the question of afforestation touched upon, because it is part of my job to persuade an unwilling Government that afforestation work is worth carrying on. Sir Joseph Cook has said that the Empire should be self-supporting with regard to its timber supplies. What is the position actually ? We had much information brought together at the Imperial Conference in 1919, and, as far as I can make out from the reports which were presented to that Conference, although we have something like 1,200,000,000 acres of forest land in the Empire, imports nevertheless exceed exports to the extent of something like 150,000,000 cubic feet per annum. The real problem of timber supply is, where are we going to get our soft woods ? Mr. Searles-Wood, in his interesting lecture, has already made that point ; and I am emphasising it because when one gets into the question of hard woods, everybody who knows the hardwood of his own country—whether it is English oak, or blackwood, or any other indigenous wood—is convinced that it is the best for the purpose for which he is accustomed to see it used. And it is a fact that if we merely want hard woods, we can get three or four hundred out of the Empire which will fulfil, nearly enough, any general requirement ; I except the special requirements.

With regard to conifers and soft woods generally, the position is such as to make those who look ahead very uneasy indeed. Practically all the soft woods in the Empire—if we except the Himalayas, a little soft wood on the Eastern part of Australia, and a little in New Zealand, which they do not wish to export—practically all the conifers are in Canada. There is so little in Queensland that they damped down exportation and reported that in a very few years the supply would be worked out : it is in the Official Report which came from the Queensland Government. (Sir Joseph Cook : "Nonsense !"). I am glad to hear that, because it has lifted at any rate one straw off the camel's back.

The position is this : if one thing is certain it is that the Canadian supply, in due course, will go to America. We used to import from Canada as much timber as America imported from that Dominion ; but at the present time 90 per cent. of the Canadian timber goes into the United States, and shortly all of it will go there, and when that occurs this country will be dependent on Russia and the Baltic countries.

It has been suggested that, because we cannot grow in this country all the timber we want, we should not grow any. That was a suggestion that came from the highest quarters and I would like to refute it. If you cannot get a full meal, you like at least to have something. And although we were badly scared in the war over our timber supplies, we are in danger of forgetting about it. Forestry operations in this country, even if they do not yield the magnificent results set out in the optimistic reports to which Sir Joseph Cook alluded, will at least bring to the nation some measure of security. I thank Mr. Searles-Wood for his lecture.

Mr. ALAN MUNBY [F.] : I have had the privilege, on one or two occasions, of acting for the Institute on timber matters, and the occasion which impressed me most was one on which we met a certain English association, and our difficulty there was the question of home-grown timber. This association said to us : "We are prepared to supply you with the timber you want, but what we complain of is, that you do not give us the market for it." We said : "If you tell us you can supply the timber, there is not much doubt about your getting the market for it." That seems to be one of the main difficulties with regard to the use of British timber. You have two sides, and both sides want the field to be ready for them. If they started on some common ground, we could get the question properly solved. There is no doubt about the difficulty that if we specify English timber we are in an uncertainty about being able to get it at the right time and properly seasoned, and people who produce these things say there is no market for them. We want some definite fusion, so that the two sides can come together and make some mutual arrangement which will enable a proper cultivation of British timber to continue.

I have much pleasure in supporting this vote of thanks to Mr. Searles-Wood.

The PRESIDENT : In putting to you this resolution, I only want to add a word of thanks to Mr. Searles-Wood for his valuable paper. Practising architects are very unenterprising in the matter of timber ; we are ignorant to a large extent—I am not ashamed to say that ; we are timid about specifications ; we are far short of what we ought to be in discriminating one timber from another. I heartily join in thanking Mr. Searles-Wood for the very wide range of information he has placed before us.

Mr. SEARLES-WOOD, in reply : I have only one further word to say, and that is about this beautiful wood karri. I said it was stronger than jarrah because of its interlocking grain. I did not say it was good for sleepers. It is used for railway carriages, and the interlocking grain is a feature which makes it stronger than jarrah. I thank you, gentlemen.

## Notes on the Planning of Sanatoria, Infectious Diseases Hospitals, and other Public Health Institutions

By JOHN WILSON [F.I., F.R.S.E., PRINCIPAL ARCHITECT SCOTTISH BOARD OF HEALTH

(Continued from p. 301).

### V. MATERNITY AND CHILD WELFARE CENTRES AND MATERNITY HOMES AND HOSPITALS.

Under the Notification of Births (Extension) Act, 1915, local authorities received statutory powers to "make such arrangements as they think fit and as may be sanctioned by the Local Government Board (now in Scotland the Scottish Board of Health) for attending to the health of expectant mothers and nursing mothers, and of children under five years of age." Over 76 per cent. of the local authorities in Scotland have provided or are in course of providing facilities for the prevention and treatment of ailments in expectant mothers, nursing mothers, and children from birth to school age, and a number of local authorities have also provided facilities for dealing with cases of confinements, both normal and abnormal.

The institutions provided under Maternity and Child Welfare Schemes may be classed as (1) Maternity, Child Welfare and Special Treatment Centres, (2) Maternity Homes and Hospitals, and (3) Day Nurseries.

**MATERNITY, CHILD WELFARE AND SPECIAL TREATMENT CENTRES.**—The Maternity, Child Welfare and Special Treatment Centre should provide treatment on both preventive and remedial lines, the curative part of the work being analogous to the treatment afforded by the out-patients' department of a general hospital. The size of the centre will vary according to the population of the area to be served, but in a large burgh the following accommodation will be necessary. (Fig. 9).

1. A maternity centre to which expectant mothers will come for advice and any necessary minor treatment for medical conditions. It should consist of:—

(a) A waiting-room.

(b) An examination-room with a dressing-room and lavatory accommodation in conjunction.

(c) The doctor will use the examination-room as his consulting-room.

(d) A dispensary.

(e) Sanitary annexe.

2. A child welfare centre to which mothers would bring their children for weighing, examination and treatment, and themselves receive such advice and treatment as is necessary for their own health and the health of their children. (Fig. 10.) This medical supervision should be continuous and at regular intervals up to five years of age, in order that the child's progress

and development may be safeguarded. The child welfare centre should consist of:—

(a) A waiting-room.

(b) Weighing and demonstration room.

(c) Doctor's consulting-room.

(d) Dispensary.

(e) Sanitary annexe.

3. A special treatment centre for children from one to five years of age, where minor ailments, especially those affecting eyes, ears, nose, throat, teeth and skin, may be prevented and cured. It should consist of:—

(a) A waiting-room.

(b) A treatment-room for eyes, ears, nose and throat.

(c) A dark-room for eyes (this would also be used as the photographic room in connection with the X-ray room or skin clinic).

(d) A doctor's consulting-room.

(e) A dispensary.

(f) Sanitary annexe (this would be used in common with the annexe in the child welfare centre).

4. A dental clinic should also be provided, and this would consist of:—

(a) A special waiting-room of small size.

(b) Consulting and treatment room.

5. A skin clinic should also be provided, and this would consist of:—

(a) A special waiting-room of small size.

(b) An X-ray room.

(c) A doctor's consulting-room.

(d) A dispensary.

(e) A disinfecting and sanitary annexe.

6. General or common provision:—

(a) A general waiting-room, which would be used at different times for 1, 2, and 3.

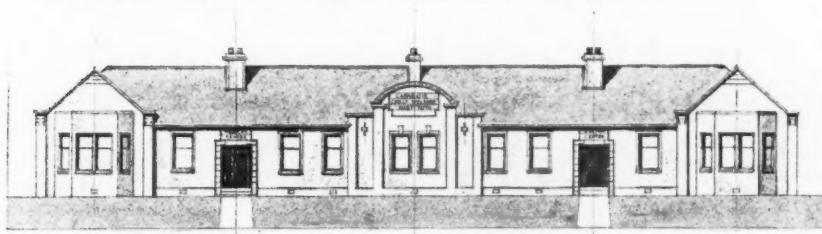
(b) A laboratory, which would combine the dispensaries under 1, 2, 3 and 5.

(c) A doctor's and dentist's private room, which would also serve as their cloakroom.

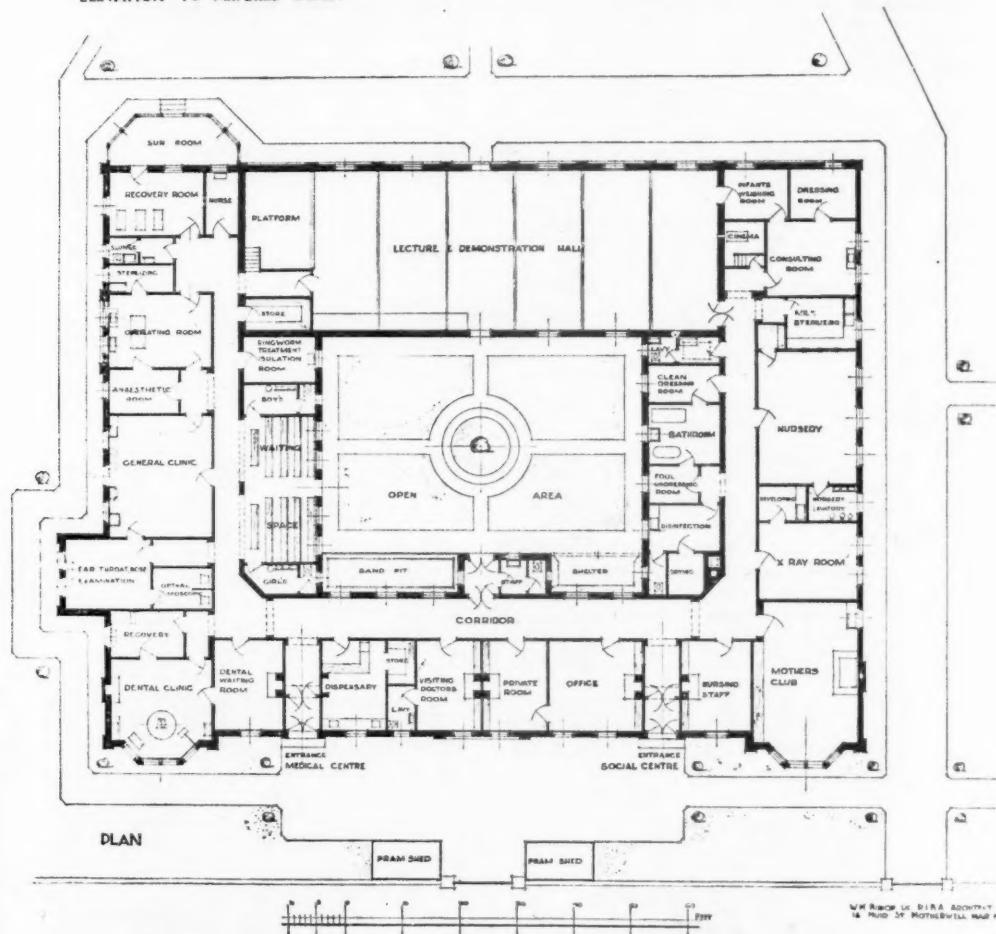
(d) A nurses' room, which would serve as the clerical room and inquiry office.

(e) A rest room with—in large institutions—two small bedrooms in addition. (These would serve for the recovery and temporary detention of patients after minor operations or other treatment.)

BURGH OF MOTHERWELL.  
PROPOSED CARNEGIE CHILD WELFARE INSTITUTE



ELEVATION TO AIRDLES ROAD.



W. M. Bishop, Lic. R.I.B.A. ARCHITECT  
14, RUE DE MONTAIGNE, PARIS, FRANCE

FIG. 9.—MATERNITY, CHILD WELFARE, AND SPECIAL TREATMENT CENTRE, MOTHERWELL  
Architect : W. M. Bishop, Lic. R.I.B.A.

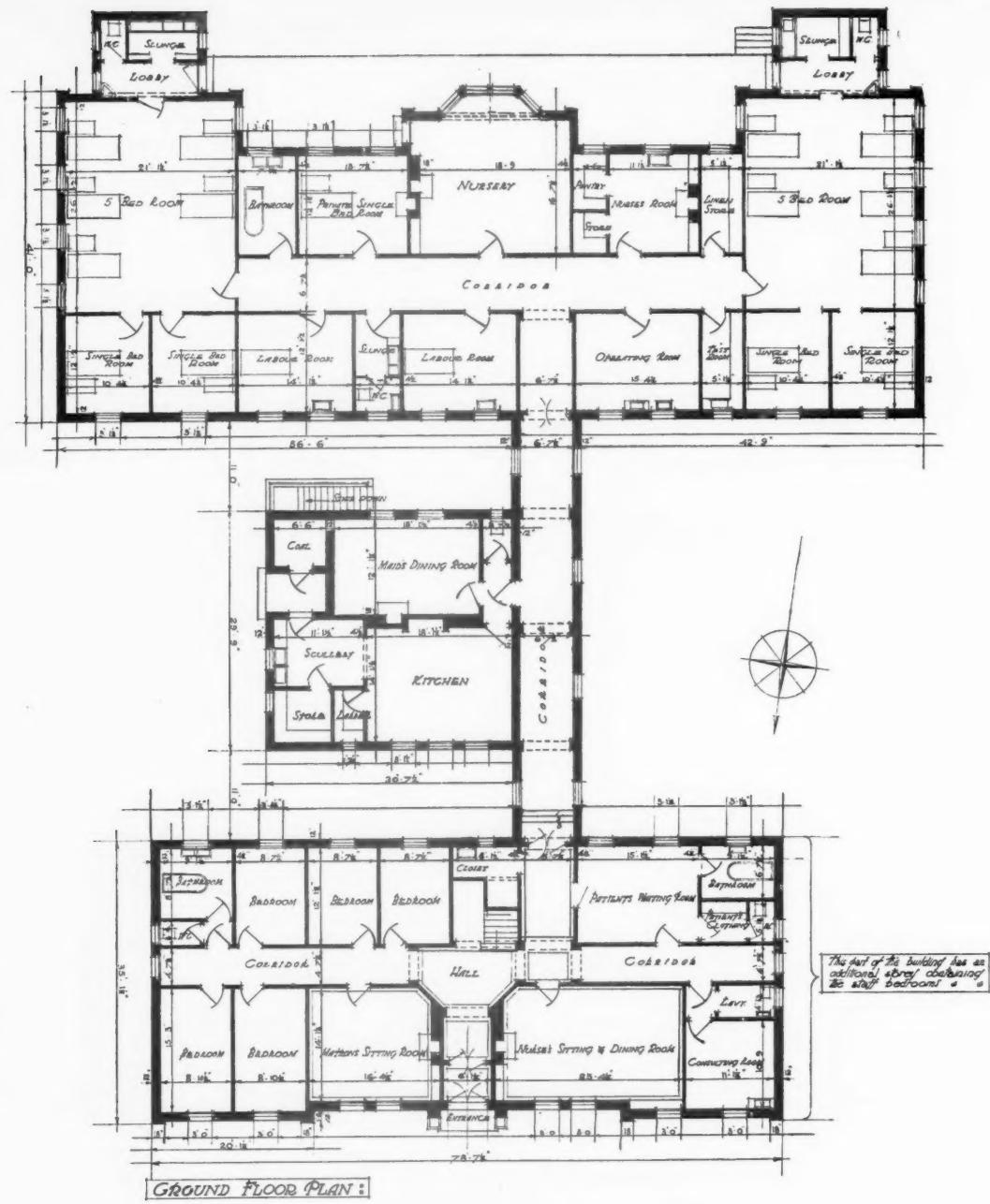


FIG. 10.—MATERNITY HOME, MOTHERWELL. Architect : W. H. Bishop, Lic. R.I.B.A.

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(f) An isolation room for the reception of a case pending removal to the hospital. This may be the same room as the skin clinic waiting-room.

(g) A lecture and demonstration room or hall, which would be used on occasion as the weighing, etc., room in child welfare centre. Classes in cookery, sewing, and hygiene would be held here.

(h) A nurse's bedroom for the occasional accommodation of a nurse who would attend to any case detained in the bedrooms mentioned above in 6 (e).

(i) A covered place for prams and go-cars.

(j) A toddlers' playground with covered playshed and shelter, also sanitary annexe.

Though primarily the medical side of such a centre is the most important, the social side should not be forgotten. It is necessary that the education of mothers in the general hygiene of child life should be provided for. Mothers require to be taught how to make clothes properly, how to cook food correctly, and how to prepare special diets for infants, also given instruction in many other incidental matters.

As mentioned above, a large room or hall is provided for lecture and demonstration purposes, also a nursery provided where children can be kept when their mothers are receiving instruction in cookery or in the making of clothes, etc. An outside playground is provided for the young children in addition to the inside accommodation for infants in arms.

At Motherwell, where the first large maternity and child welfare and special treatment centre in Scotland is being erected, the Carnegie (United Kingdom) Trust gave a donation of £15,000, which made it possible to erect the centre at this time.

**MATERNITY HOMES AND HOSPITALS.**—Homes are for normal cases, and abnormalities are not dealt with save in cases of emergency.

Hospitals are primarily for abnormalities or complications; though if the hospitals are training schools, the treatment of some normal cases may be necessary.

A home may have from four to fifteen beds, and can be worked in conjunction with a hospital for abnormal or difficult cases of confinement.

Normal cases (which are dealt with in homes) are generally cases whose domestic conditions are unfavourable for confinement at home. Very often a private house can be adapted for the purpose.

A hospital, on the other hand, should have not less than twenty to twenty-four beds. In the larger institution, though primarily accommodation should be provided for abnormal cases, provision should also be made for ordinary cases of confinement. A hospital should serve a population of not less than 200,000 to 300,000 people within easy access. It would seem natural to have an out-patients' department attached to the hospital, but in practice it may be found preferable

to have it situated at the child welfare centre or clinic. An ambulance should be available if the area to be served is at all extensive. (Fig. 10.)

In designing a home or hospital provision should be made for the following :—

1. Lying-in wards should vary in accommodation from one to six beds. The area of the wards should be on the basis of about 100 superficial feet per bed; this is sufficient for the patients and their infants. In some hospitals a certain amount of privacy is obtained by grouping the two or four beds together and separating each group by means of glazed screens 6 feet high.

2. A separate nursery should be provided to accommodate fretful children during the night or children whose mothers have died in the hospital. As a general rule, however, the child should sleep during the night in a cot beside the mother's bed. It should be the night nurse's duty to attend to any child requiring attention. Adjoining the nursery or ward, a small babies' washing room should be provided.

3. It is also found necessary in most homes to make provision for the accommodation of children under school age, whose mothers are in the home, in cases where no other way of providing for their care is possible. This involves the provision of a night nursery as well as a day nursery, with adequate sanitary accommodation. Mothers in the home or hospital must be protected against noises coming from the nursery and any possible danger of infection.

In cases where the child is illegitimate and the mother has no home to go to after her confinement, provision may be made to enable her to stay in the home until suitable arrangements can be made for her.

4. An ordinary labour room should have about 200 square feet of floor area. It should be fitted with a sink and a lavatory basin with an ample supply of hot water. It is desirable even in a small home to have another room that can be used as a second labour room where necessary. A small sterilising room adjoining the labour room or duty-room should be provided. The labour rooms should be isolated from the wards and nursery to avoid all noises being heard.

5. The sink-room should contain a slop sink and a sink with a teak or porcelain-enamelled draining board alongside for the washing of mackintosh sheets. Accommodation should also be provided for bedpans in this apartment.

6. A bottle room should be close to but separate from the nursery. In this room provision should be made for a bunsen ring on which milk can be heated, a sterilising sink in which the bottles can be washed, and a bottle and teat cabinet.

7. Every home or hospital should have a receiving-room placed near the entrance. A shallow bath or

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washing slab, a lavatory basin and a w.c. near at hand, should be provided.

8. A duty-room fitted in the usual manner should be provided.

9. Some provision should be made for the isolation of a septic case arising in the home or hospital. In small homes a small ward, isolated from the others, can be used for this purpose. In most cases the patient will be removed to the infectious diseases hospital as soon as possible.

10. In a small home that consists of a single building it will be well to provide a small room or rooms for use as a washing-room and an ironing-room for urgent laundry work that cannot be sent out.

11. Baths and w.c.'s should be provided for the use of patients in the ratio of 1 to 10 patients, and lavatory basins in the ratio of 1 to 6 patients. In some homes a lavatory basin fixed in each ward has been found very convenient.

12. In addition provision should be made for kitchen, scullery and offices, staff accommodation, linen presses, boxroom, cleaners' closet, etc.

The size of the medical staff of a maternity hospital will depend on whether or not it is used as a teaching centre. In the larger hospitals a resident doctor as well as a visiting staff will be necessary.

In a maternity home a matron will have charge, with a doctor available when necessary. It has been found that the ratio of staff will require to be about one nurse to every three mothers and their infants.

In regard to the equipment for homes the labour room must be suitably fitted up. Provision should be made for a special bed, enamelled and glass-topped tables for bowls, etc., an instrument cabinet, and shelves for lotions, disinfectants, etc.

In hospitals a fully equipped operating theatre is essential.

DAY NURSERIES.—It is suggested that day nurseries should not accommodate more than 30 to 40 children for those under five years of age. If only children up to three years of age are to be taken, then 30 children will be sufficient; but if children up to five years of age are to be taken, then 40 may be provided for.

The day nursery should be planned in the following manner. The reception portion should be placed at the entrance, and will consist of a reception-room, a dressing-room, a bathing apartment, and a w.c. apartment. The dressing-room and the bathing apartment should be made ample in size to meet the rush of children at the same hour in the morning. In the former it is advisable to have two sides of the room unbroken by door openings, in order that undressing benches and cupboards to contain the children's outdoor garments may be accommodated, and in the latter two shallow child's

baths on high pedestals and two or three child's lavatory basins should be provided. An apartment of ample size should be provided adjoining the bathing apartment for the accommodation of two child's w.c.'s, separated by a low stall, chambers and slunge sink. A children's room and an infants' room, adjoining one another, should be placed close to the reception portion of the nursery. The floor space allowed in these rooms for each child is 30 square feet. The roofs over these rooms should be kept open, with a height of 9 feet at the wall-head level. These rooms should have a southern exposure, with large French windows opening on a covered verandah, the floor of which may be concrete and about 10 feet wide. The roof of the verandah should project about 6 feet from the wall and be glazed. Where the staff is a non-resident one, the administration portion of the day nursery should consist of kitchen, scullery, larder, milk larder, staff-room and lavatory, linen closet, cleaners' closet with sink, small wash-house and drying-room. A small boiler-house should be provided to accommodate two small independent boilers—one for heating the rooms by means of low-pressure hot-water radiators, and the other for the supply of domestic hot water to sink, baths and basins.

The building may be of light construction, with the roofs covered with asbestos or ordinary slates. The floors, except those of the children's and infants' rooms, dressing-room, kitchen and staff-room, which will be wood, should be concrete. Sufficient space around the building should be provided for a playground, and a small pram shelter should be placed near the main entrance.

### VI. VENEREAL DISEASES CLINICS.

It is just over five years since the Scottish Board of Health placed on Local Authorities by Order the obligation to submit schemes for the treatment and prevention of venereal diseases.

Over 79 per cent. of the local authorities have provided or are in course of providing facilities for the free treatment of all classes at convenient hours and under suitable conditions.

In the larger cities clinic accommodation has been found in the general hospitals. In smaller towns and country areas a wood hutment has often been utilised for use as a clinic. Both sexes are treated at the clinics, but at separate hours or on separate days.

The accommodation required for the larger type of clinic is as follows:—(Figs. 11 and 12).

1. A waiting-room of moderate size, with an office adjoining, should be provided. The clerk in charge hands out the treatment cards, or in the case of new patients makes arrangements for their examination by the medical officer. A small portion of the office should be used as a weighing space for patients. A lavatory should also be attached to the waiting-room.

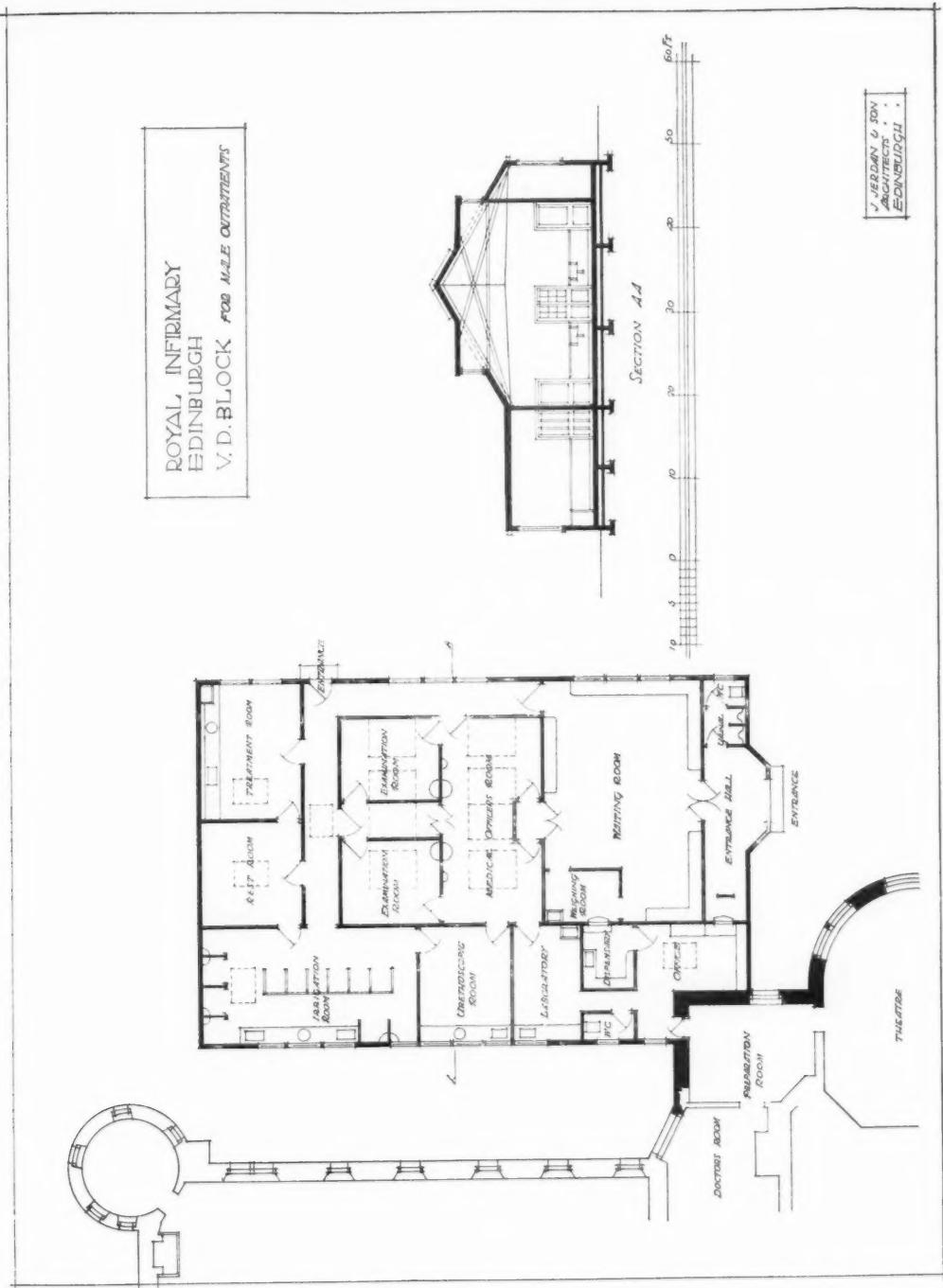


FIG. 11.—V.D. CLINIC, ROYAL INFIRMARY, EDINBURGH. Architects : J. Jerdan & Son

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2. A medical officer's examination room, about 15 feet by 12 feet in size, with sink and basin, should be provided. Two dressing cubicles, about 8 feet by 6 feet, should be attached to this apartment, and each have a small urinal basin. After examination by the doctor the patient passes to either the treatment room or to the irrigation room, and both these rooms should be placed as near as possible to the examination room.

3. The treatment or "606" room should be about 14 feet by 12 feet in size. At one end sinks and lavatory basin with hot and cold water should be placed. Shelves for bottles should also be provided.

4. The irrigation room should be of an oblong shape, with the walls tiled to a height of 5 feet.

The floor of the irrigation room may be laid in asphalt, lead or vitreous tiles with  $\frac{1}{8}$  inch joints, and graded to a channel of enamelled fireclay. Asphalt is difficult to lay with an absolutely even surface, and water tends to lie in small depressions; lead is apt to be indented by the traffic of hob-nailed boots. Possibly a floor laid in tiles with  $\frac{1}{8}$  inch joints is more satisfactory than the other two. Concrete, because of its porosity, is not a satisfactory material for the purpose.

A number of stalls should be placed in the room, with an inspection passage behind for the doctor or attendant to give instruction to the patient who has not yet learned how to irrigate himself. The stall divisions may be of porcelain-enamelled iron or enamelled fireclay, 5 feet 6 inches high, and placed at 2 feet 6 inches to 3 feet centres.

An enamelled fireclay trough, fixed about 2 feet 4 inches to 2 feet 6 inches above the floor, should be placed at the back of the stall divisions. The back of the stall divisions should be enclosed by means of a slab of the material chosen to a height of 9 inches above the trough level. The floor channel will be placed immediately under the trough and connected to the soil drain.

The irrigator apparatus for each stall consists of a metal container of two pints capacity attached to a pulley arrangement, in order that the pressure required for irrigation purposes can be regulated. Arrangements should be made whereby the container cannot be raised to a greater height than 3 feet 6 inches or 4 feet above the fireclay trough. One or two sitz baths or bidets should be placed against the side walls of the room for the use of patients who require them. A sink and lavatory basin with hot and cold water should also be provided.

In some cases a continuous enamelled fireclay trough fixed to the wall about 2 feet 4 inches to 2 feet 6 inches above the floor, with or without stall divisions, has been used.

It is contended that, apart from the lack of privacy due to the omission of stalls, it is impossible to supervise the patients properly from behind when irrigating

themselves whether stalls are used or not. This can only be done when the stalls have an inspection passage at the back.

5. A small waiting-room or rest-room should be provided close to the treatment and the irrigation rooms. This room can be used for two purposes: (a) for the patients who have passed through the doctor's hands in the examination room and are waiting for treatment in either the treatment room or the irrigation room, and (b) for the reception of a patient who has temporarily collapsed under treatment.

6. A special room should be provided for urethroscopic work, with the necessary apparatus.

7. A laboratory in which tests and culture work can be done should be provided. A small dispensary can be attached to the laboratory.

A store should be placed near the treatment room for drugs and dressings, while a linen press and lavatory accommodation for the staff should also be provided.

The floors of all the apartments, with the exception of the irrigation room and the laboratory, may be of wood covered with linoleum.

In the smaller centres the clinic will of necessity be smaller, but should contain a waiting-room with office, an examination room, a treatment room, an irrigation room, and a small rest-room, with the necessary lavatory accommodation.

It is essential that the clinic should be so planned that the patients can pass from the examination room to the treatment or irrigation rooms and then leave the clinic without again passing through the waiting-room.

Where the clinic is attached to a general hospital, wards for in-patients of both sexes should be provided, but where the clinic is not worked in connection with a general hospital it may be necessary to provide a small block attached to the clinic by means of a connecting corridor. In this block it will be necessary to provide two wards, each containing two or three beds, for patients of both sexes. Each ward should have a sanitary annexe containing bathroom and w.c. A nurse's duty-room placed between the wards, a staff lavatory, a sink-room, and a linen press are also required.

## VII. NURSES' HOUSES AND HOSPICES IN THE HIGHLANDS AND ISLANDS.

Power is given to Local Authorities for the erection of doctors' houses, nurses' houses and hospices under schemes made in terms of the Highlands and Islands (Medical Service) Grant Act, 1913, and approved by the Scottish Board of Health.

In sparsely populated districts it is almost impossible for the doctor to give the requisite continuous attendance in serious medical and surgical cases. To meet this difficulty it is intended to provide the necessary facil-

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ties by the erection of nurses' houses and hospices near or within easy reach of a doctor's house.

The smallest of these hospices will consist of a house of three apartments for the nurse, with the addition of a consulting-room and dispensary for the doctor (about 15 feet by 10 feet), a single-bed ward (about 11 feet 6 inches by 10 feet), a small linen press, and, where the water supply is sufficient, a bathroom with a w.c.

In certain districts larger accommodation will be needed, and hospices may require to contain a nurse's

house of four apartments, and two wards with one or two beds in each. These hospices will be of one storey, and built of local stone or concrete blocks.

In conclusion, I have to thank my professional friends for the help given me in preparing the lecture, and also those architects who have permitted me to use their plans to illustrate the lecture.

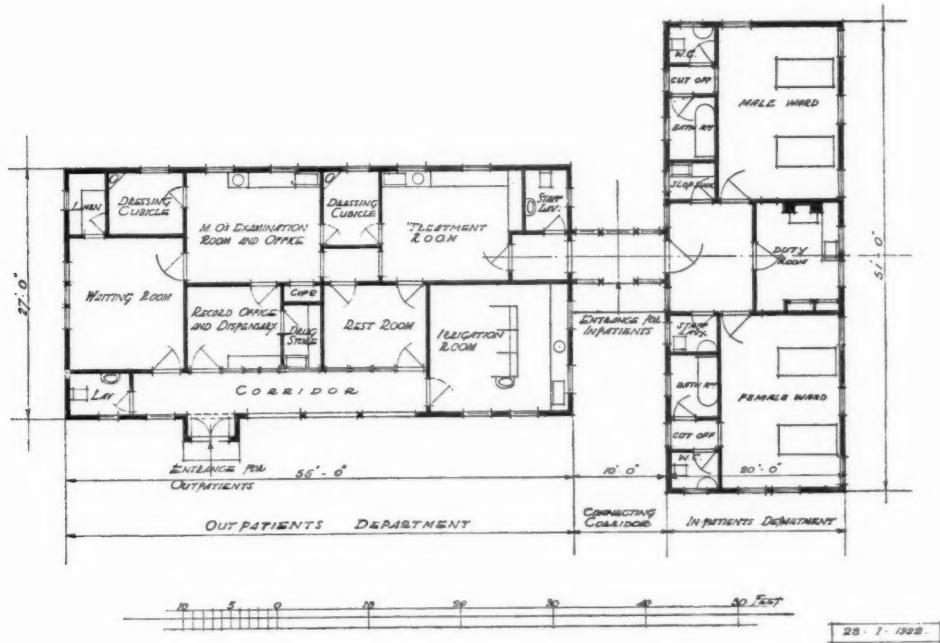


FIG. 12.—MODEL PLAN OF GENERAL DISEASES CLINIC

## Norfolk and Norwich Association of Architects

### A NEW ALLIED SOCIETY

The Norfolk and Norwich Association of Architects, which was founded last year for the advancement of the art of architecture and the protection of the profession in the county of Norfolk, and which has been admitted by the Council of the Institute as an Allied Society, held its inaugural banquet at Norwich on 24 March. Mr. Edward Boardman [F.R.I.B.A.], the first President of the Association, occupied the chair, and the principal guest was Sir Aston Webb, P.R.A. Among others present were the Lord Mayor of Norwich (Mr. H. N. Holmes), the Sheriff (Mr. H. Harper Smith), the Dean of Norwich, Sir George Chamberlain, Sir Eustace Gurney, Mr. E. G. Buxton (High Sheriff of Norfolk), Mr. W. A. Cozens Hardy, Mr. G. J. Skipper, Mr. J. W. Cockrill (Borough Surveyor, Great Yarmouth), Mr. A. E. Collins (City Engineer), Mr. W. Smith (President, Master Builders' Association), Mr. Ian MacAlister (Secretary R.I.B.A.), and Mr. E. W. B. Scott (Hon. Secretary of the Norfolk and Norwich Association).

The President expressed his gratitude to Sir Aston Webb for leaving his important duties in London to come and give them some inspiration and encouragement. Doctors and lawyers and men of commerce had their associations, and the architects of Norwich had felt for a long time that it would be good for those engaged in the same occupation and possessing the same ideals to meet together occasionally. Some eighteen months ago a rather loose organisation was established consisting of the Norwich members of the Royal Institute of British Architects, but under the advice and guidance of Mr. MacAlister, the secretary of the Royal Institute, they had opened their doors, and admitted all those in the county and city who were engaged in the practice of architecture. They did not want to set themselves up as a trade union in the narrow sense. There was work that they could do that concerned the public welfare. It was a good thing, too, for architects to exchange opinions. They could do a good deal in helping the younger members of the profession, and he hoped also they might be of service to the city. People were taking more interest in the appearance of the public streets, and when a question arose such as the position of a statue or the lay-out of a public place their association ought to be consulted. They had an excellent society in the Norfolk and Norwich Archaeological Society, with which they might often work hand in hand in the careful tending and preservation of ancient buildings. It was also desirable that architects and builders should meet together. Mr. Boardman expressed his thanks to Mr. Eric Scott for his work as honorary secretary of their association.

The Lord Mayor said one could not help associating Sir Aston Webb with the work he had done in connection with the new front to Buckingham Palace, the architectural surroundings for the Victoria Memorial, the Admiralty Arch, and other important works. The local association were to be congratulated on its good fortune in having him with them.

Mr. J. H. F. Walter (President of the Norfolk and Norwich Archaeological Society), referring to the relations between the Archaeological Society and the architects, said it seemed to him that they each sometimes adopted rather a *non possumus* attitude. They could not always see eye to eye, but that was no reason why they should totally disagree, and mutual intercourse should prove helpful.

Sir Aston Webb said it was a great pleasure for him to be with them that evening. He had thought it his duty to come, representing as he did at the moment not only architecture, but, as President of the Royal Academy, other arts as well. People did not always agree in matters of art; he might almost say that they seldom agreed in matters of art. But they should try to come more into agreement, and he felt confident that such associations as that recently formed at Norwich helped to promote a better understanding. The ramifications of the R.I.B.A. and its Allied Societies covered practically the whole of the United Kingdom, and, indeed, the whole of the Dominions of the Empire; and it was not well that any group of architects should not be represented in the confederation. He spoke with some knowledge, because he had held, he thought, every honorary office in the Architectural Association, the R.I.B.A., and the Royal Academy. He had spent a great deal of his life in connection with these societies, and he would not have done so unless he had thought that he might, at any rate, be of some little use to his brother architects. It was for the general good of the community that architects should join together. It led to good fellowship, and it also led to what was still more important—a high standard of practice. Fifteen or twenty years ago there was a heated discussion amongst architects and those connected with architecture whether architecture was a profession or an art. Some of those who contended that architecture was only an art, resigned, for a time, their membership of the Institute, but they eventually came back again. The truth was, of course, that architecture was both an art and a profession. Young men who were entering the profession would, he hoped, take advantage of the opportunities that were being provided for their education. Delightful as the practice of architecture was, it was also a very serious and responsible occupa-

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tion. An architect had to spend other people's money, and, as a man of honour and a just man, it was imperative he should see that every penny was laid out to the best advantage. Permanence was a quality of architecture: there were, of course, buildings erected for temporary purposes, but most buildings were intended to last a long time. Every building ought to possess the qualities of beauty and proportion. It was possible for architecture to make as strong an appeal to the emotions as music or sculpture.

Those present, Sir Aston Webb said, were inhabitants of a city that was historical and beautiful—a great possession for any body of citizens. In a modern city, although it ought not perhaps to be so, it was not possible to awaken the same interest or enthusiasm. It was a great privilege for young men to grow up in such a city as Norwich. Their cathedral was, in his opinion, one of the finest of Norman churches. It had all the grandeur and massiveness of Norman work and yet had a lightness that was often absent in Norman churches. Norwich, he had been told, contained thirty-five churches, and he had seen in the Castle Museum an excellent model of the city which showed the towers of these churches. He could not help wondering whether there had been any suggestion that there were too many churches in Norwich! He said that because there was an idea in the City of London that there were too many churches there. He hoped that if the number of churches in Norwich was found to be a little redundant they would still maintain them for the sake of the beauty and amenity of their beautiful city. If they were pulled down they would find that their loss could never be replaced. Sir Aston then referred to the work of the London Society in preserving and promoting the amenities of the City of London.

### ALLIED SOCIETIES.

#### BIRMINGHAM ARCHITECTURAL ASSOCIATION.

The ninth general meeting of the Birmingham Architectural Association was held at the Birmingham School of Art on Friday, 24 February. Mr. H. T. Buckland [F.] took the chair, and Mr. H. Worthington [A.], M.A., gave an illustrated lecture on "Michele San Michele of Verona."

Mr. Worthington spoke of the danger of blind enthusiasm for a past style unless tempered by critical historical study, and said that the best way to study a period is to specialise on a man.

San Michele was a typical child of his age, with a passion for Roman antiquity, yet he faced the needs of his day, and in his fortifications adapted the needs of modern military engineering to meet the developments of modern artillery. He recast the planning of town and country houses to meet a growing sense of security in city life. One of the last of the Renaissance giants, he sums up the period of culmination, and shows traces of the coming decadence.

In character San Michele had the enlarged outlook of one who constantly associated with great men. He was a

loyal citizen, a staunch servant of the state, and a devoted friend. He practised in the same manner as modern architects, and had his share of awkward and exasperating clients.

Mr. Worthington showed many slides illustrating the walls and gates around Verona, the fortifications at Parma and Piacenza, and the Fort of S. Andrea, carried out by San Michele, and concluded with a description of his characteristics.

#### THE ROYAL INSTITUTE OF THE ARCHITECTS OF WESTERN AUSTRALIA INCORPORATED.

The amended constitution of this Allied Society, carrying with it the use of the title "Royal," has been approved by the Council of the Institute under the provisions of By-law 79.

### Exhibition of Original Architectural Drawings of the Seventeenth Century

An exhibition of original architectural drawings of the seventeenth century will be held in the galleries of the Institute from the 2nd to the 17th May. It comprises two historic collections, of which one is only a recent discovery. The larger forms the Coke collection of Smithson drawings, consisting of about a hundred sheets, which has kindly been loaned to the Institute by Mrs. S. Coke, of Brookhill Hall, near Nottingham, their present owner. Mr. Gotch, in a Paper which he read before the Institute in 1908, on "The Development of House Design in the Reigns of Elizabeth and James," deals at length with the collection, of which he gives a catalogue. He is unable, however, in his critical analysis, clearly to identify to which of three Smithsons (Robert, Huntingdon or John), the drawings may be definitely ascribed. The second collection, comprising drawings by John Webb (1611-1672), has only recently become known, and is fully described by Mr. Gotch in a Paper which he contributed to the Institute JOURNAL on 24 September 1921. They have been lent to the Institute by Sir Vere Isham, of Lamport Hall, Northamptonshire, in the possession of whose family they have been since the time of Sir Justinian Isham, the second baronet, who employed Webb as his architect. In addition to the drawings there is a number of letters from Webb which throw considerable light on the practice of an architect in the seventeenth century. By members of the Institute and others who are interested in a historic phase of English architecture the exhibition of the drawings will be welcomed, and the courtesy of Mrs. Coke and Sir Vere Isham in giving the drawings a wider publicity than is possible in a private collection much appreciated. Mr. Gotch has kindly consented to give an address upon the drawings during the exhibition.

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### Street Architecture Award

1. With a view to encouraging excellence of design in street architecture, it has been decided to examine annually the buildings erected or completed during the year ending 31 December, within a radius of four miles from Charing Cross, and to award a premium for the most meritorious external design.

2. PREMIUMS.—The architect of the premiated building will receive a bronze medal presented by the Royal Institute, together with a diploma signed by the Jury of Assessors. For the present the Jury propose to hold in reserve the question of affixing devices to premiated buildings.

#### 3. CONDITIONS :—

(a) The building must front to a street, road, square or court to which the public has access within the four-mile radius. The award is intended for a street façade as opposed to churches or public buildings, for which a separate medal may be awarded.\*

(b) The architect is the person from whose design the building has been executed.

(c) Any Member or Licentiate of the Royal Institute shall be at liberty to nominate any building (not excluding his own work) for consideration by the Jury. Forms of nomination will be issued with the first two numbers of the JOURNAL in each Session. These forms, which must be accompanied by an elevation to scale and a photograph of the exterior of the completed building, for the information of the Jury, must be in the hands of the Secretary R.I.B.A. by the end of February 1923. These documents will be returned (carriage paid) to the sender after the award has been made. The Jury do not bind themselves to confine their selection to the buildings nominated.

4. JURY.—The award will be made by a Jury of five, appointed by the Council of the Royal Institute, and composed of :—

Three architects,  
One Member of the Royal Academy,  
One Honorary Fellow of the Royal Institute.

The term of appointment will be for three years. Before making their award, the Jury will personally inspect such of the buildings as they deem worthy. The award will be final and binding on the Council of the Royal Institute and the architects concerned.

5. PRESENTATION.—The presentation of the premium to the architect will be made annually at a meeting of the Royal Institute, of which the date will be announced in the Press.

In submitting the above conditions the Jury desire to inform the Council that they are not yet in a position to select an artist for the design of the medal, but that they hope to make a recommendation upon this point later.

\* (NOTE.—It may be possible to extend the system of awards later on to provincial cities and towns in conjunction with the Allied Societies.)

For the present the Jury propose to hold in reserve the question of affixing devices to premiated buildings.

The Jury for the award for the present year consists of :—

The Earl of Crawford and Balcarres [Hon. F.], Chairman.

Sir Aston Webb [F.], P.R.A., Past President R.I.B.A.

Mr. Paul Waterhouse, P.R.I.B.A.

Sir Reginald Blomfield, R.A., Past President R.I.B.A.

Mr. E. Guy Dawber, Vice-President R.I.B.A.

### Summoning General Meetings

The Secretary of the Institute has sent the following letter to the Press :—

22 March 1922.

DEAR SIR,—Several members interested in this question have been inquiring from me as to the method of summoning General Meetings of the Royal Institute and as to the length of notice required, and I understand that there has been some correspondence in the professional Press on the point. It may interest your readers to have a statement as to this.

Broadly speaking, there are three ways in which a matter of this kind can be laid before the members of the Royal Institute for consideration :—

1. The Council can summon a Special General Meeting for any date they choose, specifying the business to be discussed. They can give the amplest possible notice of such a meeting, and they can call it either on their own initiative or at the request of a member or members.

2. The subject can be discussed by the Council putting it down as one of the matters for consideration at one of the four fixed Business Meetings of the Session ; or any member or members can send in notice for such a meeting. In this case very long notice can be given of the meeting so as to ensure adequate discussion.

3. Any twelve members can demand the summoning of a Special General Meeting by sending a requisition to the Council, and the Council are bound forthwith to call the meeting. It must be held within three weeks after the delivery of the requisition to the Secretary. This provision in the by-laws obviously makes it impossible to give more than at the outside 10 days' notice to members, as the requisition to the Secretary has first to be laid before the next meeting of the Council, who have to fix the date and order the printing and sending out of the notice.

In other words, there are three methods of summoning these meetings, two of which allow of ample notice being given, while the other makes it impossible to give more than a very few days' notice. It is, of course, open to members to adopt any of these three methods which they prefer.—Faithfully yours,

IAN MACALISTER,  
Secretary.

## Competitions

### AUCKLAND MEMORIAL COMPETITION.

The following cablegram was received from the Mayor of Auckland, New Zealand, on 29 March 1922 : "The Secretary, Royal Institute of British Architects, 9 Conduit Street, W.—Memorial Museum Competition. Major Axes Maori Hall and Maori Court must be parallel. In Halls where span requires intermediate support desirable two such supports placed approximately quarter span from adjoining wall. In Main Entrance Hall, Central Hall, Central War Memorial Hall, and Hall Memories, supports left discretion competitors. For Memorial Trophies and Memories Halls lighting system left competitors. Posting first mail final memoranda and Answers Questions. Designs due Auckland thirtieth June, but owing irregularity mails will allow fortnight extension. Advise competitors."

The following cablegram has been sent by the R.I.B.A. to the promoters of the Auckland Memorial Competition :—

" 29 March 1922.

" Gunson, Mayor, Auckland, New Zealand. Corrected conditions received London March eighteenth. Further answers expected middle April and middle May. Drawings must leave London twenty-sixth April to arrive Auckland thirtieth June. Time for completion obviously insufficient. Committee emphatically request date for despatch of designs from London be fixed thirtieth June. Please cable reply."

The following cable was received on 31 March 1922 in reply : " Ribazo London.—Agree your request extension June thirtieth. London subject plans being shipped first mailboat thereafter."

### NEWPORT (MON) WAR MEMORIAL COMPETITION.

The Competitions Committee desire to call the attention of Members and Licentiates to the fact that the Conditions of the above Competition are unsatisfactory. The Competitions Committee are in negotiation with the promoters in the hope of securing an amendment. In the meantime Members and Licentiates are advised to take no part in the Competition.

IAN MACALISTER,  
Secretary.

### COMPETITIONS OPEN.

**Auckland War Memorial.**  
**R.I.B.A. Colour Competition.**  
**Dundee War Memorial.**

The conditions and other documents relating to the above competitions may be consulted in the Library.

## Notices

### ELECTION OF MEMBERS, 12TH JUNE, 1922.

The following applications for election have been received. Notice of any objection or other communication respecting the candidates must be sent to the Secretary for submission to the Council prior to Monday, 15th May, 1922.

#### AS FELLOWS (10).

ANDERSON : ANDREW WHITFORD [A. 1884], 28 High Street, Watford ; 18 Wellington Road, Watford.  
BRADDELL : THOMAS ARTHUR DARCY [A. 1920], 13 Old Quebec Street, Marble Arch, W. ; 2 Lansdowne Road, W.11.  
BROWN : WILLIAM EDWARD ARTHUR [A. 1904], 9 Regent Street, S.W.1 ; 69 Ross Road, Wallington, Surrey.  
CROMIE : ROBERT [A. 1914], 8 Gloucester Mansions, Cambridge Circus, W. ; 21 Adelaide Road, Surbiton.  
CURTIS : WILLIAM THOMAS [A. 1904], Guildhall, Westminster, S.W. ; "Linkwood," Link Lane, Wallington, Surrey.  
MOLE : CHARLES JOHNS, M.B.E. [A. 1909], H.M. Office of Works, Westminster, S.W.1 ; "Glenlyn," Bowes Road, Walton-on-Thames.  
OWEN : GEOFFREY [A. 1912], Palmyra Square Chambers, Warrington ; Myddleton Hall, near Warrington.  
RIDDEY : CHARLES [A. 1898], Gold Street Chambers, Kettering ; "Stoneleigh," Queensberry Road, Kettering.  
RUDDLE : ALAN WILFRID [A. 1909], 6 Long Causeway, Peterborough ; Boroughbury, Peterborough.  
SOUTER : ERNEST GEORGE WILLIAM [A. 1905], 3 St. James's Street, S.W.1 ; Stafford House, Crescent Gardens, Wimbledon Park, S.W.

#### AS ASSOCIATES (24).

ALWARD : WILLIAM WALLACE, M.Arch. [Special War Examination], c/o Messrs. Nobbs & Hyde, 14 Phillips Square, Montreal, Canada ; 127 Drummond Street, Montreal, Canada.  
ANDREWS : CYRIL DOUGLAS [Special War Examination], 222 High Street, Ponders End, Middlesex.  
BEAUMONT : JOHN SOMERLYN, M.C., B.A. [S. 1921—Special War Exemption], 24 Brazenose Street, Manchester ; 4 Wellington Crescent, Upper Chorlton Road, Manchester.  
CHEEK : ALFRED CYRIL [Special War Examination], c/o Messrs. Seale & Riley, 25 Horsefair Street, Leicester ; 98 Howard Road, Clarendon Park, Leicester.  
CLARK : HAROLD GOUNDRY [Special War Examination], Feethams, Darlington ; Summerhill, Abbey Road, Darlington.  
DAVIES : HAROLD HINCHLIFFE [Special War Examination], 14 North John Street, Liverpool ; 20 Eighth Avenue, Stoneycroft, Liverpool.  
DAWSON : HARVEY ALEXANDER [Special War Examination], c/o Bank of Montreal, 9 Waterloo Place, S.W.1.  
HARRILD : FRED, M.A.Oxon [Special War Examination], 57A High Street, Totnes, S. Devon.  
HAYWARD : JOHN HAROLD [Special War Examination], 60 Grant Street, Glasgow.  
JACKSON : HAROLD THOMAS [Special War Examination], Bush House, Aldwych, W.C.2 ; 15 Petherton Road, Highbury, N.5.  
JENKINS : THOMAS TREVELYAN [S. 1922—Special War Exemption], 18A Balfour Chambers, Stanley Street, Liverpool ; 6 Tennyson Street, Princes Park, Liverpool.  
LAY : ARTHUR PURCELL [Special War Examination], 149 Upper Richmond Road, Putney, S.W.15.  
PRYNNE : HAROLD FELLOWES [S. 1921—Special War Exemption], P.W.D. Secretariat, Chepauk, Madras, India.

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REEVES : JOHN EDWARD [Special War Examination], 158 Waterloo Road, Smethwick, Birmingham.  
ROBERTSON : ALEXANDER SMEATON [Special War Examination], Department of Works and Railways, Treasury Place, Melbourne, Australia.  
SADLER : WILLIAM [Special War Examination], 41 Thornhill Road, N.1.  
SAMPLE : EDMUND FREDRICK RONALD [Special War Examination], c/o Messrs. Denison, Ran. & Gibbs, Beaconsfield Arcade, Hong Kong, China.  
SEATON : WILLIAM GEORGE [Special War Examination], 22 Mackintosh Road, Pontypridd, Glam.  
THOMPSON : CHRISTOPHER CRAIG [Special War Examination], 24 Crescent Road, Toronto, Canada.  
THREAFGOLD : ROBERT AINSLIE [S. 1914—Special War Examination], 107 Hall Lane, Liverpool, E.  
TOWNSEND : ARTHUR CECIL [Special War Examination], 7 Rawlins Street, Fairfield, Liverpool.  
VON BERG : WILFRED CLEMENT, M.C. [Special War Examination], Imperial War Graves Commission, St. Omer, France.  
WHITELEY : CUTHBERT CLAUDE MORTIER [Special Examination], 37 Harold Street, Hawthorn, Victoria, Australia.  
WILLMAN : JOHN HENRY [Special War Examination], 65 Greenway Avenue, Taunton.

### AS HONORARY ASSOCIATES (10).

ASHBY : THOMAS, D.Litt., F.S.A., Director of the British School at Rome, Valle Giulia, Rome, Italy.  
BELL : CHARLES FRANCIS, M.A., F.S.A., Ashmolean Museum, Oxford.  
CLUTTON-BROCK : ARTHUR, B.A., The Red House, Godalming.  
COCKERELL : SYDNEY CARLYLE, M.A., Director of the Fitzwilliam Museum, Cambridge.  
CORNFORD : LESLIE COPE, 3 Melina Place, Grove End Road, N.W.8.  
CRANAGE : REV. DAVID HERBERT SOMERSET, Litt.D., F.S.A., 8 Park Terrace, Cambridge.  
MONTGOMERY : HENRY GREVILLE, J.P., 39 Wynnstan Gardens, W.8.  
NEW : EDMUND HORT, 17 Worcester Place, Oxford.  
PHILLIPS : R. RANDAL, Atherton House, Ham, near Richmond, Surrey.  
WELLER : HENRY OWEN, B.Sc., M.Inst.C.E., Director of Building Research, 16 and 18 Old Queen Street, Westminster, S.W.1.

### THE CIVIC SURVEY OF GREATER LONDON.

It has been decided by the Council of the Institute to approach the London County Council and endeavour to arrange for the continuance of the work of the Civic Survey for Greater London as a means of providing employment for architects during the present period of depression.

### THE METROPOLITAN WATER BOARD.

Mr. H. W. Burrows [A.] has been appointed as representative of the Royal Institute to confer with a Sub-Committee of the Water Board on the revision of the regulations for the prevention of waste, misuse, undue consumption, or contamination of water.

### REINSTATEMENT OF MEMBERS.

Mr. C. F. Ward [F.], and Mr. J. Hardwick Higgs [Licentiate], have been reinstated members of the Institute.

## Members' Column

### FOR SALE.

STRONG dumpy level with compass in mahogany case.—Apply R. E. Crossland, A.R.I.B.A., 9, King's Bench Walk, Temple, E.C.4.

LARGE set of drawers (in two pieces) to take Antiquarian size sheets, about 4 ft. high, deep drawers.—Apply "Architect," 73, Oakhill Road, East Putney, S.W.15.

### PARTNERSHIP.

A.R.I.B.A. desires a share in well-established Practice, Provinces preferred. Would like to supervise or commence a Provincial Practice in connection with one already established in London. Age 31. Six years' office experience (general practice) and two years School of Architecture, University College, London. War Service.—Box No. 1732, c/o Secretary R.I.B.A., 9 Conduit Street, W.1.

F.R.I.B.A. requires a partner. General country practice.—Apply Box 627, c/o Secretary R.I.B.A., 9 Conduit Street, W.1.

### APPOINTMENTS WANTED.

A.R.I.B.A. (28) desires position as Assistant in a London office. Working drawings, details, specifications, surveying and measuring. Neat and accurate draughtsman. Excellent testimonials.—Apply Box No. 643, c/o Secretary R.I.B.A., 9 Conduit Street, W.1.

ARCHITECT, Fellow Royal Institute Architects, Ireland, and M.T.P.I., until recently practising in Ireland, wants partnership, Plymouth or neighbourhood. Age 40. Excellent connection. Expert on Housing and Town Planning. Would manage branch office for London firm.—Apply Box 3422, c/o The Secretary R.I.B.A., 9 Conduit Street, W.1.

## Minutes XIV

SESSION 1921—22.

At the Eleventh General Meeting (Ordinary) of the Session 1921—1922, held on Monday, 3 April 1922, at 8 p.m.—Mr. Paul Waterhouse, President, in the chair. The attendance book was signed by 17 Fellows (including 5 members of the Council), 21 Associates (including 1 member of the Council), 2 Licentiates, and a large number of visitors.

The Minutes of the Tenth Meeting held on 20 March, having been taken as read, were confirmed and signed.

The Hon. Secretary announced the decease of Mr. Frederick William Marks, elected Associate 1887, Fellow 1905. It was RESOLVED that the regrets of the Institute for the loss of this Member be recorded on the Minutes of the Meeting, and that a message of condolence and sympathy be conveyed to his relatives.

At the suggestion of the Hon. Secretary, it was RESOLVED that a message of congratulation be sent to Mr. G. Gilbert Scott [F.] on his election as a Royal Academician.

The following members attending for the first time since their election were formally admitted by the President :—Messrs. W. A. Cheers, Sidney C. Clark, G. H. Fielder, S. Hyde, R. J. H. Minty, C. A. Trimm, Associates.

Mr. S. C. Ramsey [F.] having read a paper entitled "London Clubs," a discussion ensued, and on the motion of the Rt. Hon. Lord Justice Warrington, Chairman of the Committee of the Athenaeum, seconded by General Sir Henry MacKinnon, G.C.B., K.C.V.O., Chairman of the Committee of the Travellers' Club, a vote of thanks was passed to Mr. Ramsey by acclamation, and was briefly responded to.

The proceedings closed at 9.20 p.m.

### R.I.B.A. JOURNAL.

N.B.—*Dates of Publication.*—1921: 12th, 26th November; 10th, 24th December. 1922: 14th, 28th January; 11th, 25th February; 11th, 25th March; 8th, 22nd April; 6th, 20th May; 3rd, 17th June; 15th July; 19th August; 23rd September; 21st October.

